SKYWAYS

MILITARY ★ CIVIL ★ COMMERCIAL AVIATION

lot's Report...
Cessna 195

★

SAF's New Jet
XB_51

JAN. 1950 25¢

Safe to Fly the Soup ★ W

Look at the Beechcraft from every angle

BONANZA

greater speed!

184 mph top speed at sea level. Cruises at 170 mph at 8,000 feet, using less than 60% of maximum rated take-off power. No engine overload.

economy!

Only 9½ gallons of fuel consumed per hour. Four people with baggage carried at seat-mile cost as low as 1¼ cents.

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Sturdy framework results in extra safety margins. Rated in utility category at full gross weight, with limit flight load factor of 4.4 G's, plane was subjected successfully to special tests not required by CAA.

strength where it counts!

Note low, sturdy landing gear with wide tread and exclusive cross-bracing of struts. Nose gear position, plus long wheelbase, eliminates pitching, allows greater braking.

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Sound-proofed cabin, handsome *roomy* interior, room for four six-footers. Ease of entry and exit because of wide autotype door.

. . . then you'll see why it's a better buy!

Compare these performance features

- Top speed, 184 mph
- Cruising speed, 170 mph
- Range, 750 miles
- Service ceiling, 17,100 feet
- Fuel economy, 9½ gal. per hour

Compare these comfort features

- Exclusive retractable step
- Limousine entrance
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- Quickly removable rear seat
- Luggage compartment accessible two ways

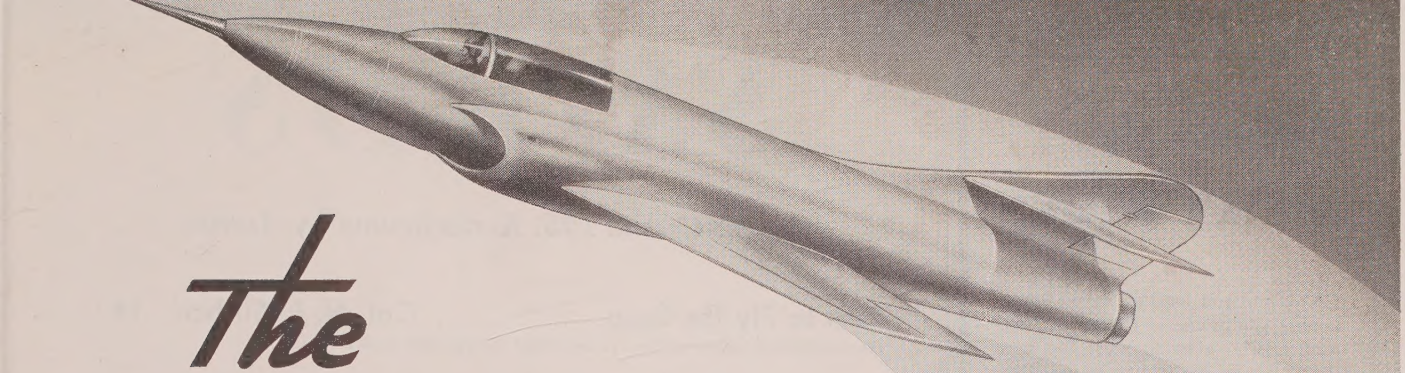
You'll find other "extras" you'll appreciate when you actually see the Beechcraft Bonanza—like the exclusive retractable step, two-way accessibility of the luggage compartment, and maximum visibility. Go over the ship yourself, soon. And for illustrated brochures that go into more details, write today on your company letterhead to Beech Aircraft Corporation, Wichita, Kansas, U.S.A.

Beechcraft

BONANZA

MODEL A35

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS



the SUPER PLANE

OF TOMORROW WILL BE DESIGNED BY TODAY'S STUDENTS

—whether the problem is to design a large super-bomber or to design a small midget racing plane—whether it is to design the airplane body, its engine, or a small bracket within the airplane—All these design problems will be solved by men who have been trained in Aeronautical Engineering:

CAL-AERO TECHNICAL INSTITUTE SPECIALIZES IN

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EST. 1929

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NAME

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Coming Up... in SKYWAYS

CAVU's to you for 1950! And here's hoping you're one of those fortunate airmen who aims to start the new year with an air trip to some place for fun and good flying. Before you mark your chart for check points, however, have a look at what's coming up in SKYWAYS . . . February issue, that is. Then be sure you pick up your copy so you won't miss the features we've planned.

Here's a portion of the line-up:

● **"Watch Your Altimeter Setting,"** *by Bob Mudge.* If you've never tried your hand at pressure-difference flying, check in with this article and take a lesson in using your altimeter as the basis of your whole navigation system. For one thing, pressure-difference flying will give you a quicker and more easily obtainable drift correction angle. Read it . . . and try it.

● **"Whip Stall Save,"** *by A. J. Nogard.* Here's a true story of what happened to a flight inspector when he was giving a flight-instructor's acrobatic test in an open-cockpit Waco . . . and the rudder jammed in a slow roll!

● **"Pilot's Report:** New 1950 (Censored)." We can't name this new one yet, because it is still a well-guarded secret in the personal plane field. SKYWAYS is announcing it, however, with a pilot's report. All we can say is . . . it's a four-placer to fit the average man's purse, and a beautiful airplane to fly.

● **"How to Fly the Hiller 360,"** *by Don Downie.* This is what happens when a conventional-plane pilot goes out to fly a helicopter. Check-Pilot Downie learns to fly the Hillercopter . . . and reports in detail this business of hovering a few feet above the ground.

● **"Air Combat—8 Miles Up,"** *by Col. N. F. Silsbee.* It's one thing to fly jet planes at high speeds at high altitudes, but it's quite another thing to use that jet plane as a fighting weapon. The problems of high-speed combat in the cold, thin air as they affect equipment and personnel are discussed.

These are just a few of the features for the pilot and plane owner who makes sure he gets SKYWAYS.

February Issue

SKYWAYS

Cover: Cessna 195. Kodachrome by Arentz

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The following publications are combined with SKYWAYS: Air News and Flying Sportsman.

AIR YOUR VIEWS

Scooter

Gentlemen:

Please let me know who makes the scooter shown on page 13 of the November issue?

E. SUTHERLIN

Russellville, Indiana

Write Argyle Manufacturing Co., 600 Coal St., Colchester, Illinois.—ED.

Thunderstorm Biz

Gentlemen:

I have always read your articles entitled "Dilbert," and you no doubt have brought a lot of boneheadedness to the attention of a lot of people and prevented several accidents. However, in your most recent article in the September issue, you have a few paragraphs entitled "Attention: Instrument Pilots." The advice given as to how to ride out a thunderstorm is sound enough and correct, and your remarks about staying the heck away from them are sound advice for the inexperienced pilot or the pilot flying a lightplane. The airline pilots, however, and military pilots fly through them regularly. I have flown as an airline pilot and as an Air Force pilot for about seven years now, and since having had sufficient experience, I wouldn't worry about flying through a thunderstorm in any but a light aircraft. At present I am on duty flying the Air Lift to Berlin and here it isn't possible to fly around weather as it would take us out of the corridor, and furthermore we are assigned to an altitude and have to maintain it.

I believe most aircraft are stressed to stand any but the most severe storms, provided those planes are properly flown. I have flown the following planes through thunderstorms: BT-13, AT-6, AT-7, B-25, DC-3 and C-54. As for getting to 30,000 feet on your back, I would not want to say that it couldn't happen, but I will say that in my experience I have never gained more than 500 feet or lost more than 1,000 feet, and I've never been near enough to the center to have been struck by lightning.

As I said before, your advice is 100 per cent correct for a certain category of pilot. However, you may imagine the effect that reading this article would have on an airline passenger who sees that his plane is about to enter a thunderstorm.

CAPT. EUGENE W. GARGES, JR.
AO—795936
330th Troop Carrier Squadron
APO 57, c/o Postmaster, N. Y.

Thanks very much for your letter, Capt. Garges. As you know, Dilbert is intended primarily for the private pilot and student pilot, and it's our hope that we can get these Dilbert lessons home in such a way as to prevent mishaps. As far as flying thunderstorms is concerned, it's been our understanding that the airlines fly through them as little as possible, passenger comfort being one of the determining factors. We're happy that the commercial airlines value the comfort of their passengers to the extent that they'll either fly a flight around a storm area, stay on the ground till it's over, or slip between the thunderheads in such a way as to give their passengers as smooth a ride as is possible under such storm proximity conditions. Personally, our thunderstorm experience is limited. However, we'll be frank to confess we don't envy you your experience in flying a thunderstorm in an AT-6, AT-7, etc., nor do we advise it.—ED.

De Havilland Beaver

Gentlemen:

In your article on the De Havilland *Beaver* there is a picture of the plane's control panel. I would like to know what the oblong control box is at the lower righthand corner of the panel. Also, could you give me De Havilland's Canada address?

T. YAEGER

Columbus, Ohio

That's the Beaver's *electrical control panel. The gage just right of center is a voltmeter; the "gage" in the left corner is a clock; and the button-switches along the bottom of the box turn on pitot heat, fuel transfer pumps, radio, landing lights, cabin lights, fan, etc. De Havilland Aircraft of Canada, Ltd., is located in Toronto, Ontario, Canada.*—ED.

BT-13 Problem

Gentlemen:

Will you please tell me some things about the BT-13. I have a bet with another guy. I said the BT-13 had a 450-hp engine, cruised at 135 mph and weighed somewhere around 5,000 pounds. Will you give me the dope?

SGT. R. P. FARMER

Camp Lejune, N. C.

You pose a problem there, Sgt. Farmer, because the performance figures the USAF give out are quite different from the figures the fellows who flew them specify. For example, according to official performance figures, the BT-13 has a top speed of 173 mph, but an Air Force cohort here maintains the BT-13 would drop its wings at that speed . . . or at least give out with a shudder and groan. Which opinion do you want. . . Air Force or Air Force pilot? On cruising, our AF friend claims the best he could get out of a BT-13 was somewhere around 115 or 120 mph. . . and with a lot of coaxing. The engine is 450-hp Pratt & Whitney. Gross weight is 4,360 pounds.—ED.

That "G" Business

Gentlemen:

I would like to know the meaning of the expression "g" as used in the November article, "High-Speed Stalls."

ROB'T COWLING

Neenah, Wisconsin

The symbol "g" is used to denote the acceleration of gravity, e.g. the acceleration of a free falling body due to the attraction of gravity. . . or often called "gravity pull." In aviation the "g" is a measure of the force that is developed or exerted on an aircraft in pulling out of a maneuver. In "pull-outs" from a dive, for example, the "g" is a symbol to indicate the relationship between the speed of the dive and the normal pull of gravity: 9 "g's" means nine times the normal pull of gravity.—ED.

Hot Pilot to-be

Gentlemen:

I am one of the many ardent readers of SKYWAYS and I sure enjoy getting it out here in

Yokohama, Japan. This is the first time I've written to you, but I feel that other airmen share the opinions I'm herein expressing.

There has been a lot of talk about planes-in-the-making that will fly slower than the present planes. I have something to say about them—"Who wants 'em?"

The slow planes are okay for fuddy-duddies that want to learn to fly and don't like landing as fast as they do now. Although I'm not a licensed pilot, I fly quite frequently over here in the Army's L-5's, not that the L-5 lands too fast, but compare the landing speed of the L-5 to that of the *Helioplane* and note the difference. Of course, you could always land a slow-flying plane faster than its given landing speed, but if you did, they'd call you a "Hot Rock."

In the present standard lightplane, when a pilot lands he knows he's landed and he hasn't just plunked the plane down inside the hangar with someone tying it down before he has a chance to get on the brakes.

When I'm a happy civilian back in Jersey again, you can bet your last dollar this boy won't be checked out in a child's plane.

PFC. J. PIZZARELLI
Hqs. 8th Army TI&E Depot
APO 343
San Francisco, Calif.

Good to hear from you, Pfc. Pizzarelli. A lot of you Army fellows seem to prefer fast planes, faster, that is, than the new "safety planes" being developed. After you get your pilot's license, bring us up to date on your opinions. In the meantime, good luck and good flying—ED.

J-35 vs J-47

Gentlemen:

In glancing through some of your back issues I came across a statement (March, 1949) that the XF-89 was powered by General Electric J-35 jet engines. In the December issue, Col. N. F. Silsbee writes that that F-89 is powered by J-47 engines. Would you be so kind as to tell me which statement is correct?

CHARLES COBB III
Rye, N. Y.

The Northrop F-89 is now powered by two J-47 jet engines. The experimental model was powered by the GE J-35's, but the production version now has the J-47's, but may go back to more powerful J-35's.—ED.

Design Sketches

Gentlemen:

I have a collection of one thousand sketches of aircraft designs & inventions, most of which I think are patentable.

I want to dispose of this collection and wonder if any of your readers would be interested in having them . . . free, of course?

RENE CHARETTE
213 Besserer St.
Ottawa, Ontario, Canada

Pappy Boyington

Gentlemen:

What has become of Marine Air Ace Lt. Col. Gregory Boyington? I became interested in him during the war and made a scrapbook of his flying after reading about him in SKYWAYS.

M. HAYDEN
Clinton, Mississippi.

We haven't anything definite on Pappy Boyington right now. The last we heard of him he was in California—ED.

Air ROTC

Gentlemen:

I've read letters in your magazine from readers who think you run too much military stuff. I don't think so, and would suggest that you do something on the Air ROTC for the boys who will be taking Air ROTC in college. Also, how 'bout devoting space in SKYWAYS where boys who like to design planes could have their ideas printed in each issue. You could publish the two best ideas in each month's magazine . . and by "best" I mean according to their possibilities as real aircraft designs.

JNO. D. SQUIER
Dallas, Texas

Both are good ideas and perhaps someday we can work something out along the "amateur design" line. At the present, however, we're short of space, so will have to wait on that. Thanks for your thoughts, though.—ED.

MILITARY AVIATION

New Jets for '47

The Air Force's six-jet Boeing XB-47 bomber is now being powered by the more powerful General Electric J-47 turbojet units which develop 5200 pounds thrust in contrast to the J-35's 4,000 pounds. With this additional 25 per cent power, the XB-47's speed is higher than the 607.8 mph average which the '47 established on its record-breaking 3-hour 46-minute transcontinental flight of some months ago.

Thunderjet Fighter-Bomber

The versatile Republic F-84E is now being used as a fighter-bomber by various squadrons of the Air Force. In addition to the *Thunderjet's* normal armament of six 50-cal. guns, the fighter-bomber version of the F-84 carries 32 HVAR rockets, each weighing 140 pounds (*see photo*). An alternate version carries either 16 HVAR and two "Tiny Tim" rockets or 12 HVAR, two "Tiny Tims" and two 230-gallon wingtip tanks to increase the ship's operating radius.

Alaska to Japan

The 375th Weather Reconnaissance Squadron of the Military Air Transport Service is now making regularly scheduled flights between Eielson Air Force Base, Alaska, and Yokota Air Force Base, Japan. Purpose of the flights is to obtain weather information for more accurate forecasting of weather along the Great Circle Route to the Far East. Flights to Japan, bridging a gap of some 3,630 miles between Alaska and Japan, take from 17 to 18 hours, while flights from Japan to Alaska over the same route take from 15 to 16 hours.

Air Force-Navy Pilot Exchange

Carrying out the new Air Force-Navy pilot exchange program, the Continental Air Command has announced that eight of its pilots have been assigned to Navy units for a year's training, and 11 Naval aviators have been given similar assignments with the Air Force. Thus far, both services have exchanged 25 of their pilots for a year's training, and more will be exchanged as the program develops.

This One's on Me

Recently a retired Army Colonel (Cole P. Stone) paid a visit to Marine Air Station at El Toro, California. Intrigued by the activity on runway 25, the Colonel approached an officer standing near the runway to ask what was going on. The officer, Capt. Wm. F. Guss, explained that he was runway officer and was coaching jet pilot-students to safe landings, using a portable radio set to talk to the students as they came in. Capt. Guss went further to explain that he was also grading each student and that in the interest of safety, Marine Fighting Squadron 311 had set up a system of fining both students and instructors for any errors in proper procedure. Taxiing with flaps down, landing with canopy closed, etc., brought a fine to the erring student, and this fine went into the squadron's coffee mess fund.

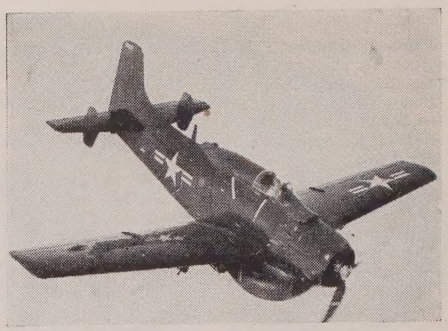
Just as Capt. Guss finished his detailed explanation, student pilot Lt. Bob Breeze set down his TO-1 jet smoothly on the runway. The landing, his second, was perfect but in California's hot sunshine the brightly burning landing lights on the jet plane appeared incongruous.

Capt. Guss radioed Breeze, instructing him to turn the lights out, then made a notation in his little black book. The erring student was slated to pay 25 cents for his boner.

When Capt. Guss had finished his writing, the Colonel asked to see the sleek jet at close range, and the Captain obliged. The Colonel gazed in amazement at the gadgets and gages surrounding the pilot's seat, as the Captain explained their functions. At the end of the inspection and "lecture," the Colonel turned to the Captain, handed him a quarter and exclaimed, "I'd like to pay that young man's fine." He did.

First Flight Logged

The USAF's new Martin XB-51 made its first flight recently. Newest of the Air Force's jet ships, the XB-51 is a three-jet ground-support bomber with drastically sweptback wings and T-shaped tail (*see page 18*). It is powered by three General Electric J-47 jet engines, each producing over 5200 pounds of thrust.



RADOME slung under AD-3W's nose houses the Douglas *Skyraider's* radar antenna

Radar Skyraider

The Navy's newest electronic airplane is the Douglas AD-3W *Skyraider*, a version of the standard AD attack series built by Douglas at its El Segundo, California plant. Bulging shell beneath the nose of the ship is a plastic radome which houses the AD-3W's radar antenna. The *Skyraider* is probably one of the most versatile airplanes in service today, being capable of performing a variety of combat duties. The Navy has received over 500 *Skyraiders* from Douglas in the past three years. The ship is powered by a Wright R-3350 engine.

Wha Hoppened?

With unvarying precision, student pilots wheeled their AD-2 *Skyraiders* down the taxiway for simulated carrier take-off practice from the Navy field at Charleston, Rhode Island. The routine was the same for each: taxi to take-off position, lower the folded wings to normal flight position, race down the runway and leap skyward.

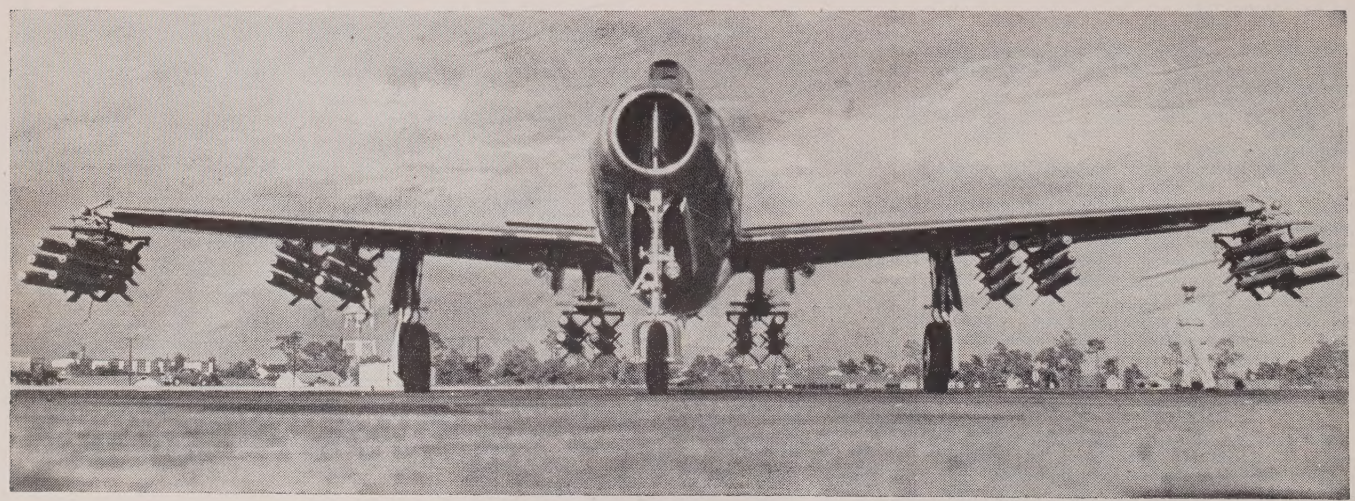
Recently, during one such practice, the control tower operator "froze" at his post when he suddenly noticed that one of the students had rolled far beyond the 300-foot mark where the Douglas attack planes should be airborne.

At 2500 feet, the plane finally left the runway and began to climb. At an altitude of 250 feet, it banked steeply to the left and plunged into a clump of trees.

"Wha' hoppened?" the dazed pilot asked when the rescue crew freed him from the demolished plane.

"Nothing much," he was told by a disgusted rescue crewmen. "You merely forgot to lower your wings!"

PUNCH of the *Thunderjet* is shown in this photo of F-84E, built by Republic. It carries clusters of 32 5-inch High Velocity Aircraft Rockets



PLANE FAX

How Central Air Services Cuts Repair Bills

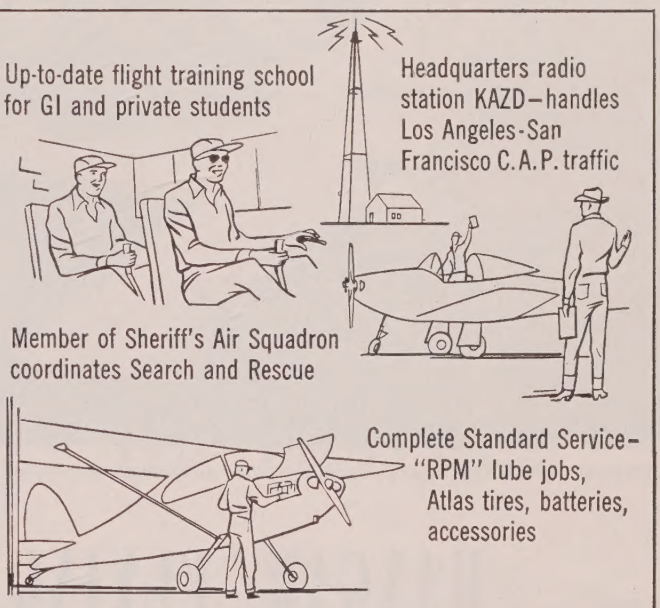
Frank E. Furlong, owner of Central Air Services at Furlong Field, Fresno, California, tells how RPM Aviation Oil helps cut maintenance costs on the 75 planes at his field. "We have used 'RPM' since it has been on the market and have never known what it means to have a sticky valve. That goes for our many customers, also.

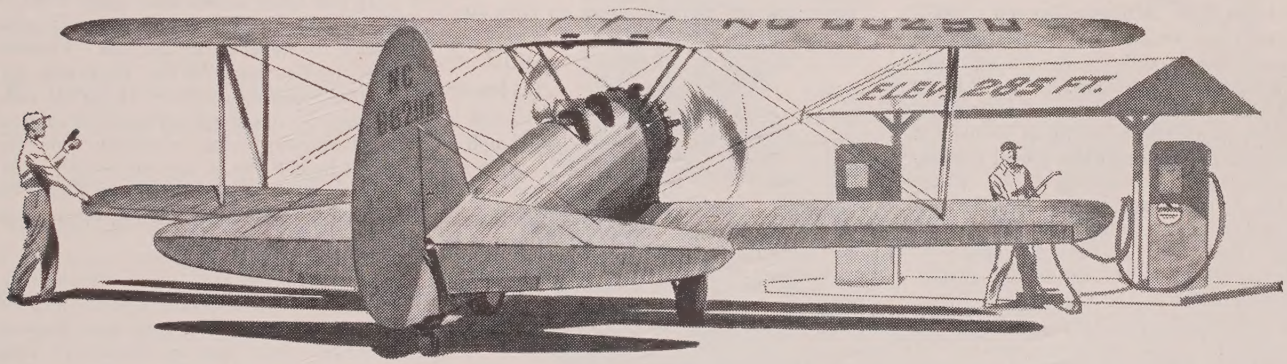
"Our engines have run many hundreds of hours on 'RPM' and maintenance has been kept to a minimum. We have an 85 H. P. engine that was torn down for a major overhaul after 1500 hours and the cylinders were worn less than a two-thousandth of an inch.

"After these wonderful results, it's a pleasure to recommend 'RPM' aviation products to all our customers."

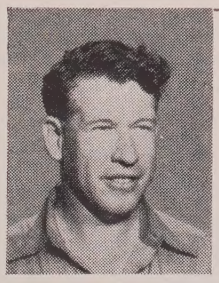
Quick picture of

FURLONG FIELD Fresno, Calif.





Tip of the Month



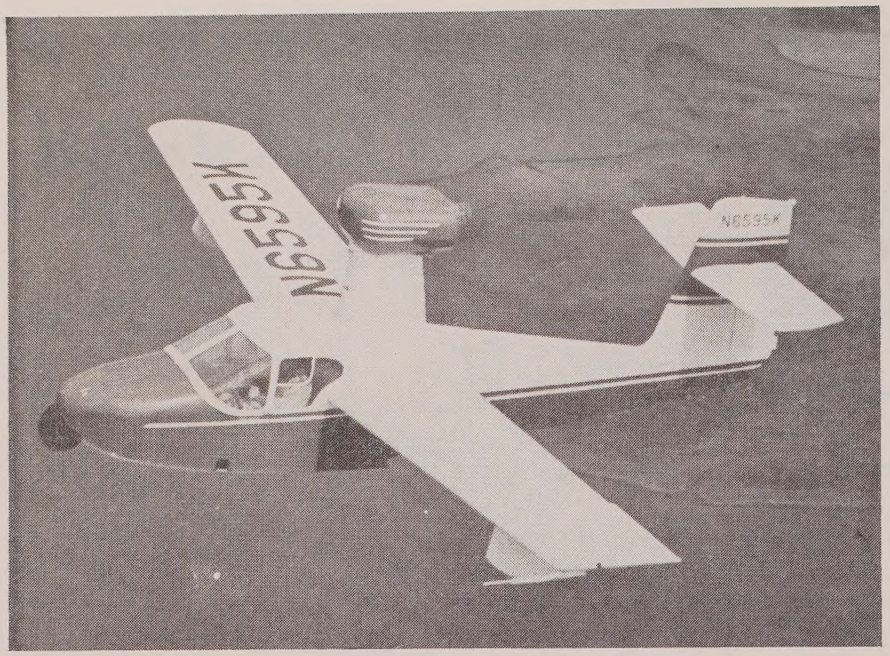
"How to make your gasoline give you greater flying range"

"We've found that Chevron 80/87 Gasoline is so efficient that we can lean out the mixture in our small planes at high altitudes, which reduces the fuel consumption and lets us fly farther on a tankful of gasoline."

—Frank Furlong,
owner, Central Air Services, Furlong Field.

All "Furlong" planes have switched to new Chevron 80/87 Gasoline—now get peak power for less money

"We're all glad that Standard came out with the new Chevron 80/87 Gasoline," Mr. Furlong writes. "We're using it in our Pratt and Whitney 450 engines which once required 91/98 fuel. Now when we fly our BT-13 trainers and crop-dusting Stearman, we get full power without any detonation—with a lower-priced gasoline."



COLONIAL AIRCRAFT is readying its two-place pusher-type amphibian for the 1950 market

HANGAR FLYING

New Lightplane Altitude Record

The National Aeronautics Association has announced the establishment of a new altitude record for lightplanes. Flying a Piper PA-11, Mrs. Mildred Zimmerman of Reading, Pennsylvania, climbed to an altitude of 26,138 feet, according to the official calibration of a barograph carried in the plane. Mrs. Zimmerman reported she reached 10,000 feet in 13 minutes, and 20,000 feet in 45 minutes. Former record for lightplanes with an engine displacement between 122 and 244 cubic inches was 24,311 feet, set in 1940 by Grace Huntington in a Taylorcraft.

New Personal-Plane Amphibians

Pilots and prospective plane owners who have been holding out for an amphibian will be heartened by the news that two new amphibs are on the threshold of production. In New York, Colonial Aircraft has its two-place XC-1 *Skimmer* in the process of certification, while in Ohio the Eldred Development Corp., is readying its Model ED-2, a low-wing, three-place amphibian.

The *Skimmer* is an all-metal two-placer that can seat a third. It is powered by a 115-hp Lycoming engine in pusher position and is fitted with an Aeromatic F-200 prop. The amphib's tricycle landing gear is retractable, and its wings with slotted flaps provide optimum climb and glide control and excellent landing performance. Tentative price for the *Skimmer* has been set at $8,750 FAF.

The Eldred Development Corporation's Model ED-2 is a low-wing amphibian which features a unique float installation. The ship's twin floats are blended into the wing in such a manner as to eliminate the drag-increasing float brace struts. The ED-2 is powered by Continental C-145 engine developing 145 hp at 2700 rpm at sea level.

Following are available specs on both airplanes:

	XC-1	ED-2
Engine:	115-hp	145-hp
Top Speed:	120 mph	119 mph
Cruising:	110 mph	107 mph
Range:	5 hrs	4 hrs
Climb:	667 fpm	600 fpm
Gross wt:	1950 lbs	2100 lbs
Empty wt:	1300 lbs	1323 lbs
Fuel Capacity:	40 gals	40 gals
Span:	34′ 2″	34′
Length:	23′ 5″	21′ 7″

U. S. Airlines Gain Upper Berth

For the first time, airline travel in the U. S. has exceeded first class railroad travel, Pullman, in passenger miles. According to figures provided by Alvin P. Adams & Associates, aviation consultants, 603 million air passenger miles in May compared to 582 million for Pullman. In June air again exceeded Pullman, with 673 million against 653.

All American Air Maneuvers

Miami's All American Air Maneuvers will be held this year on January 13, 14 and 15, according to word from NAA which has sanctioned the 18th annual show.

Feature of the race will be the Continental Trophy Race which is open to midget planes of 190 cubic-inch piston displacement. Original plans for the Continental Race called for a two-mile rectangular course with four pylons, necessitating 90° turns. Revised NAA plans call for same length course but with six pylons so no turn will be more than 60°.

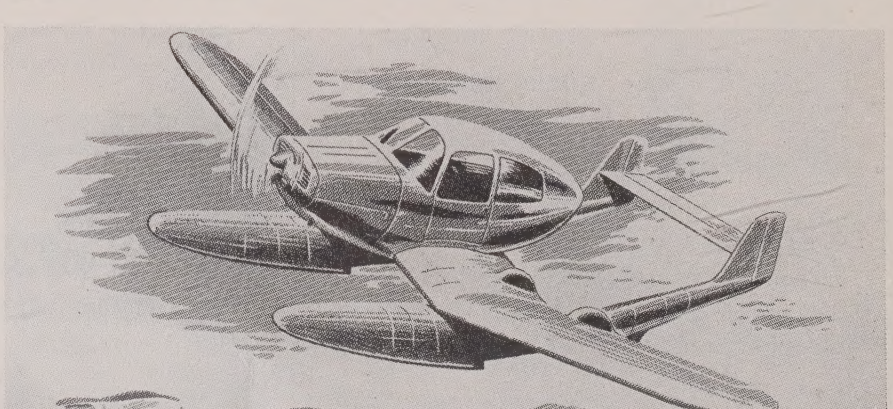
This year's All American show will be staged at Opa Locka Navy air field.

Idling . . .

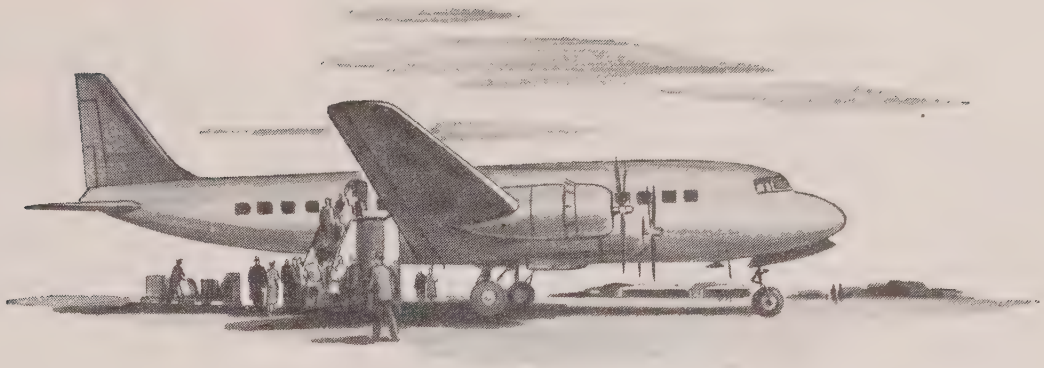
This has been a month of new books for the aviation minded, and there's a set of four that we especially like: "*Private Flying: Today and Tomorrow*," by W. T. Piper ($4.50); "*Learning To Fly*," by Bert A. Shields ($4.00); "*Private Pilot's Handbook*." by A. G. Norwood ($4.50); and "*Seaplane Flying and Operations*," by Fogg, Strohmeier and Brimm ($3.75). All of these are from Pitman Publishing, and very much worth having in your aviation library. If you're learning to fly . . . or know someone who is . . . we don't know of a better or more complete course in aviation than that contained in these four books. And if you don't want all four, but would like one or two, you won't go wrong getting either "*Private Pilot's Handbook*" or "*Learning to Fly*."

. . . If you know a teen-ager (girl, that is) who's interested in aviation and will want someday to work at it, get her "*Faraway Fields*," by Patricia O'Malley. It's fiction that details the exciting career of an airline publicity girl . . . and it's authored by one of the best-known women in aviation, one who knows whereof she writes and really rides the beam in writing it. "*Faraway Fields*" is published by Dodd, Mead and Company, and sells for $2.50.

. . . If you're the kind of an airman who shies away from aviation motion pictures (and up until now you've been wise in doing so), forget your past annoyance at what Hollywood does to aviation and go to see Warner Bros.' "*Chain Lightning*." It's a terrific picture that tells the story of high-speed jet and rocket flight. Even though the story is "fiction," there's many a man who'll admit there's a lot of truth in the high-speed development the movie portrays. If you want a glimpse of tomorrow, be sure to see "*Chain Lightning*." We think it's terrific!



ELDRED CORP. is building its prototype model amphibian, a sketch of which is shown here



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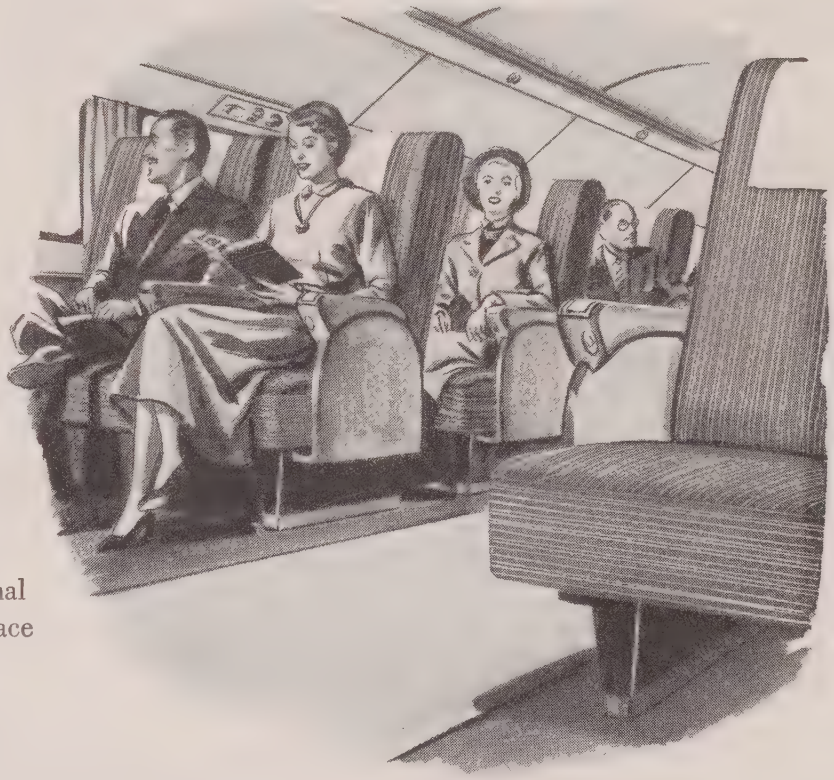

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PROP WASH

Aero Oddities

Stage Fright. On cross-country at 4,000-foot altitude, Air Force cadet's plane developed trouble. He radioed Tower, was told to leave ship immediately. Later, when cadet made report of incident and stated he'd left ship at 1,000 feet, officer asked why he'd stayed with plane so long. Cadet replied, "It took me that long to hang the mike back on the hook!" *(I. Stavin, Brooklyn, N. Y.)*

Wide Acquaintance. En route to Spokane, Washington in Cessna 170, pilot made several calls to radio range stations along the way, using the word "Roger" frequently. Passenger finally turned to pilot with query, "How come you know someone by the name of 'Roger' at every station?" *(M. L. Weinberg, Quincy, Illinois)*

Come Again, Please? Tower operator spotted Air Force Twin-Beech coming in with gear up, called pilot frantically, warning him of his "error." Plane slid along runway on its belly, finally came to a stop. Initiating another call, the Tower operator groaned, "Didn't you hear my warnings that you had not lowered your gear?" Pilot called back, "Yes . . . . so I turned to my copilot and said, 'Some dope is coming in with his gear up!'" *(D. A. Krupp, Philadelphia, Pennsylvania.)*

Quick Sale. Pilot in Aeronca C-3 made forced landing in farmer's field, breaking off a wheel in the process. Pilot had passenger get out, hold ship up by wing tip, then run along holding wing up 'til plane picked up flying speed. Pilot got out of field okay, flew back to home base, made successful one-wheel landing, then returned to farmer's field in car to pick up passenger who'd pinch-hit for the broken wheel. *(W. S. Shipley, Peever, S. Dak.)*

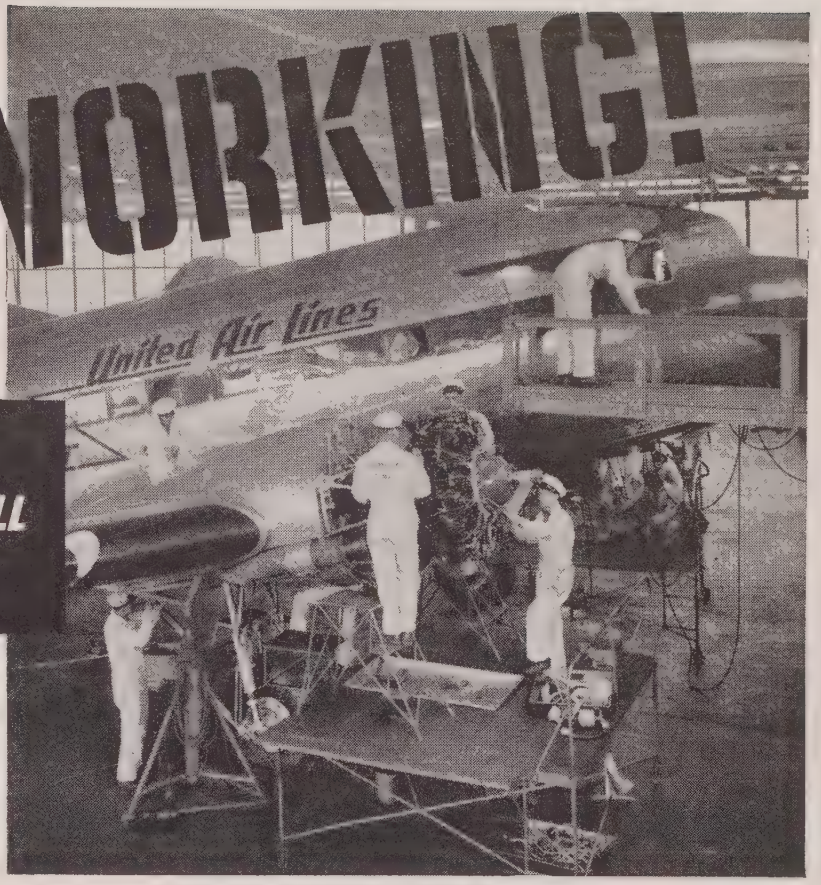
New Customer. Aircraft service specialists Kemp and Kelsey have rendered all types of repair and rehabilitation, but most unusual customer was a curlew snipe that landed on their ramp. Completely fagged by heat, bird taxied into the shade beside hangar door and "tied down." Kemp and Kelsey carried water to the bird, then brought it inside office for air conditioning and 100-hour inspection. Six hours later, in cool of evening, bird walked out of Service office, took another sip of water, then took off without waiting for light from the tower. CAA notified K and K it had decided landing and take-off were of emergency nature, so would file no violation against their long-legged "customer." *(B. Arentz, Salt Lake City, Utah)*

Circle of Confusion. Surplus Fairchild, towing an advertising sign, lost prop over the city. Pilot released the sign, managed a 180 on a dead stick, and put the plane down between a football field and housing project. Plane rolled across ground, jumped across a curb of railroad ties, sped along a gravel street that ran through the housing project. Noticing it was nearing streetcar line and still going at a fast rate, pilot hit right brake, spun plane around to a halt. Damage: prop went through a resident's attic roof, sign landed atop grocery store, and one confused police officer demanded to see the pilot's license! *(D. Mullins, Chicago, Illinois)*

Att'n Readers:

If you have any news note oddities pertaining to aviation, send them to SKYWAYS, Box 17, 444 Madison Avenue, New York 22, N. Y. Five dollars will be paid the sender of each "oddity" printed. Contributions cannot be returned unless accompanied by stamped addressed envelope. The decision of the editors is final.

MEN WORKING!



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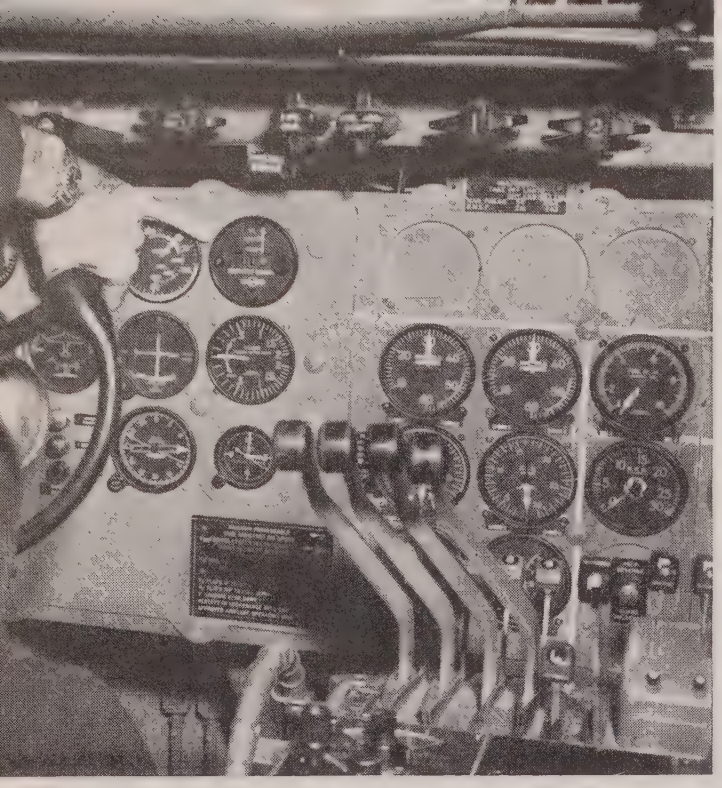


AMERICAN AIRLINES' Flight Engineer points out airliner's newly installed VHF omni-range bearing selector, localizer

By COL. N. F. SILSBEE

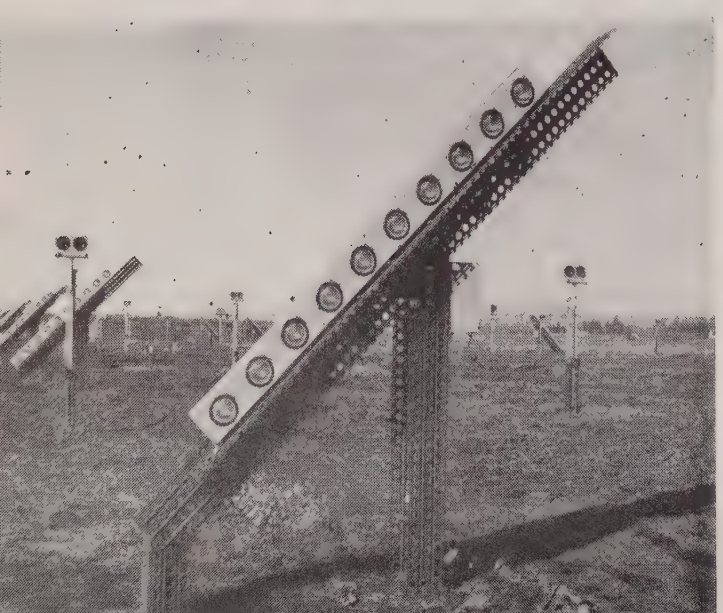
DURING the past year airline passengers have been more and more impressed with the fact that considerable portions of their air journeys are now quite normally and nonchalantly spent under weather conditions that formerly would have spelled "No flight." The winter ahead should see further progress in the reliability of scheduled airline service. Where last winter was good, this winter should be even better. Progress resulting from four years of postwar experience and development is beginning to really show up.

The "improvements" that make this airline-schedule progress possible include the radio instrument landing system (ILS), the Gilfillan radar ground controlled approach (GCA) system, VHF radio, etc.

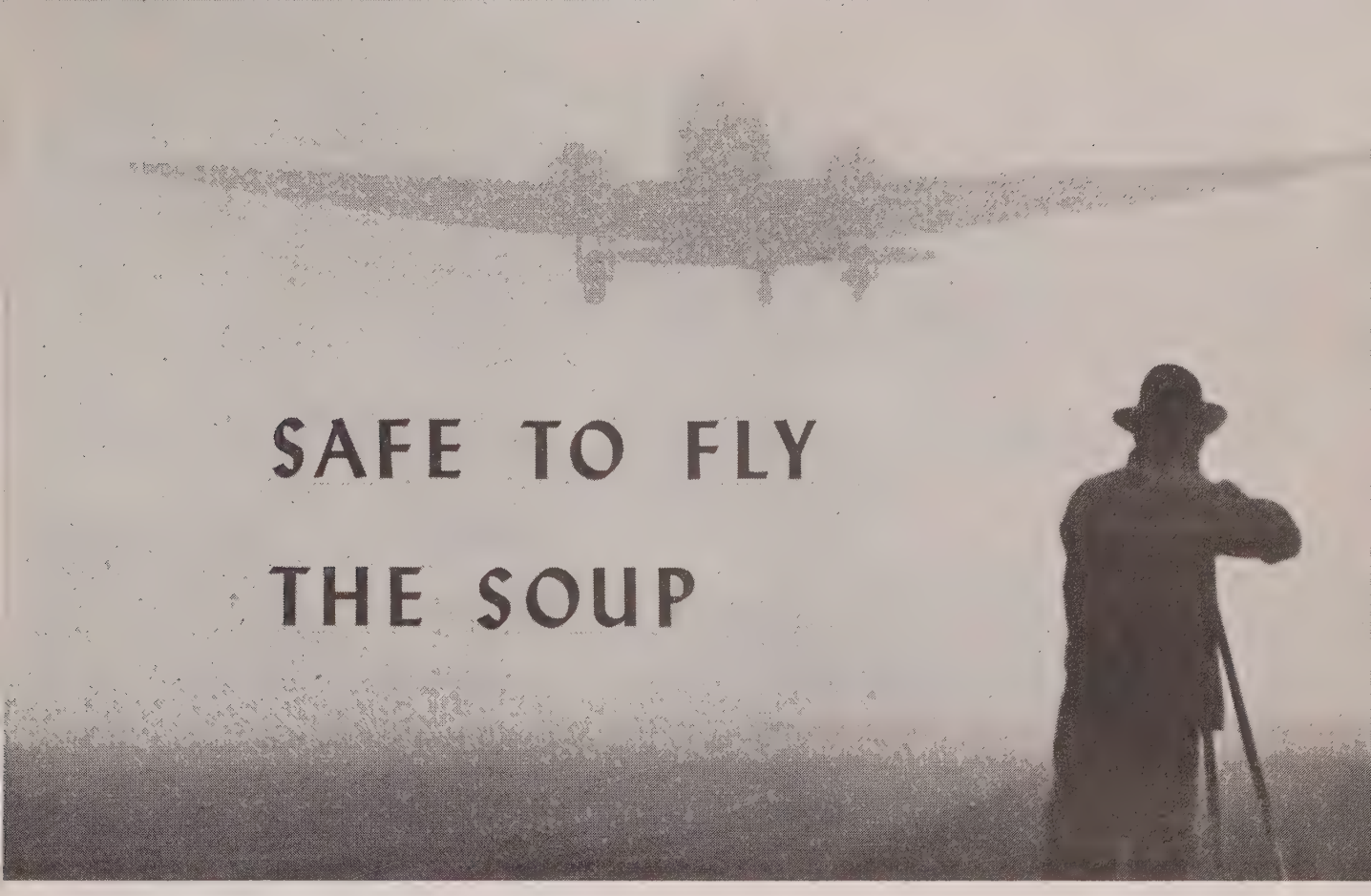
The most spectacular improvement for all airline operators will be noticed at three major air terminals—New York, Washington and Chicago—with many others across the nation also showing gains. Where last year each of these three big airports had *some* of the most recent electronic improvements installed, this winter each of them is all set for "soupy" weather.

This winter both New York and Washington will make their first operational use of long-range surveillance radar to control the spacing of scheduled aircraft, which have hitherto always arrived in the area in random fashion. Instrument sessions at LaGuardia Field (LGA) and Washington National Airport (DCA) have already seen the arrivals evened off and the rate stepped up. Chicago International Airport (CHI), which is set up with dual

PRE-FLIGHT finds Capt. Conway *(foreground)* and First Officer Pickett going over weather map with Senior Meteorologist Comstock at LaGuardia Field's "Weathering Hts" office. Slope-line lights *(below)* are another weather aid



SLOPE-LINE approach-light system at Arcata, Cal., was designed to bring aircraft in safely under poor visibility conditions



SAFE TO FLY THE SOUP

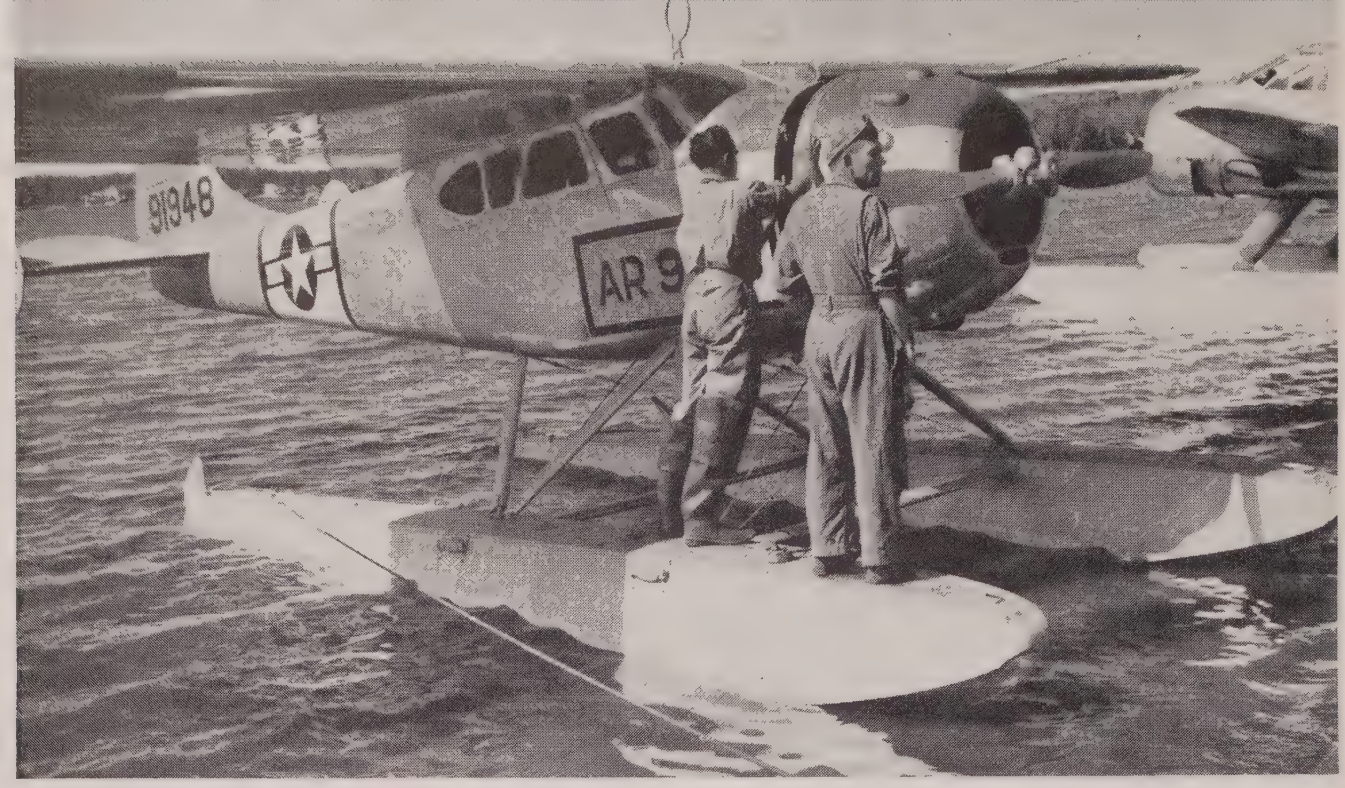
ELECTRONIC DEVICES such as airport ILS, GCA, and plane's Zero Reader, Gyropilot combine to land plane safely in fog

runways, has already achieved a movement rate as high as one plane every 90 seconds.

In addition to these aforementioned electronic aids to air navigation and traffic control, Boston, LaGuardia, Newark and Chicago have just recently been equipped with new approach and runway lighting installations designed in accordance with the recommendations of the Airline Pilots Association (ALPA). This called for a combination of standard slope-line fixtures and condenser discharge lighting. The latter, from the pilot's perch, appears as a lighted "football" passed rapidly from the approach end inward to the runway. High-intensity runway lights outline the landing area white, and slope-line fixtures with colored lights indicate clear over-run area (in red), and the first 200 feet of the runway with high-intensity lights (green).

This combination of (*Continued on page 52*)

HIGH-INTENSITY LIGHTS now installed at major commercial airports were developed by Westinghouse to take "blindness" out of "blind landings." These lights penetrate 1,000 feet of fog as they flash lightning-like 40 times per minute



CESSNA 195 in use by 10th Rescue Squadron in Alaska is designated LC-126 by the USAF. Twelve are assigned to 10th

By BOB ARENTZ

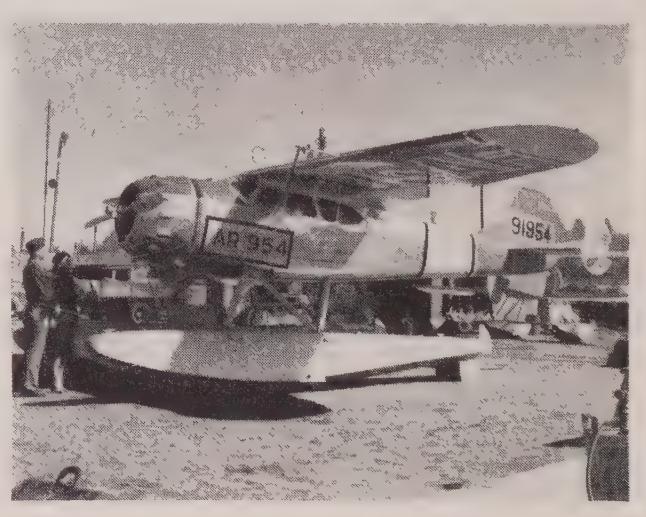
THE story may be apocryphal, but 'tis rumored that the Air Force first discovered the Cessna 195 when a bush flyer landed his float plane on a northern ice cap and, in two trips, brought out 12 injured flyers. Whether the story's true or not, the Air Force did generate interest last year in the pride and joy of Cessna.

A Cessna distributor says the regular thing happened; a delegation arrived at Wichita armed with a list of changes required for a trial order of 12 liaison aircraft. Among concommittant items was the substitution of a 450-hp *Wasp Junior* for the 300-hp Jacobs, and the indispensable half-ton of cast iron and lead deemed necessary for ballast on all small air force planes.

The fable adds that Cessna's prexy, Duane Wallace, replied substantially as follows: "Nuts! Phooey! and Hogwash!" In brief, Wallace felt that Cessna engineers had done a fair to middling job on the 195 to start with—and no changes needed.

The experimental models bought for USAF testing came off the line just the way CAA licensed them for the carriage trade, a precedent as unheard of in aviation circles as the CAA accepting an air force model for commercial use.

Designated the LC-126, the guinea pigs were earmarked for an accelerated service test by an outfit guaranteed to bring flaws quickly to light, be they metal in airplanes, or mettle in men.



PLANES operate on floats during summer months; then are put on skis for operation during winter in deep snow

The 12 Cessnas, like wartime draftees, landed at Elmendorf Air Force Base near Anchorage, Alaska, their "orders" reading "Report to 10th Rescue Squadron, Colonel Bernt Balchen, commanding."

Instead of uniforms, mess kits, and Manual of Arms, these green Johns had each a pair of floats and a set of skis. The pilots of 10th Rescue, one of the hottest groups of skilled specialists in dangerous trades drawing government pay, looked the recruits over much as a drill sergeant eyes his first batch of "over 30" draftees.

Tenth Rescue is a completely independent unit, operating substantially at Wing Level, primary assignment being air rescue under the Alaskan Air

Pilot's Report...
Cessna 195

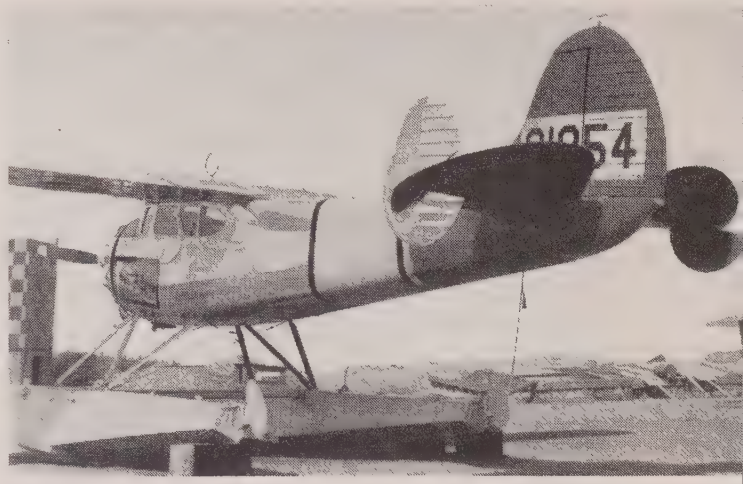
CRUISING SPEED of the ship on floats is around 130 mph. The LC-126 gets off well on floats, but climb is lessened

Command, which is a 24-hour-a-day job over a stretch of territory comparable in distance to the mileage from Seattle to Boston.

Any airplane 10th accepts has to fill a distinct need, at a reasonable cost, and be able to do its assigned work better than anything else available.

There is nothing that Colonel Balchen and his executive, Major Gene Douglas, enjoy more than getting rid of airplanes that can't stand the gaff. Some of their work is classified, all of it is of top priority importance. They once had 42 primary aircraft, consisting of 12 types, assigned for use.

These included some of the most expensive and highly touted aeronautical hazards ever extolled in paid advertising. These 12 types have now dwindled to a mere handful, and the 10th's goal is the development of four basic designs, including the indispensable helicopter. (*Continued on page 44*)

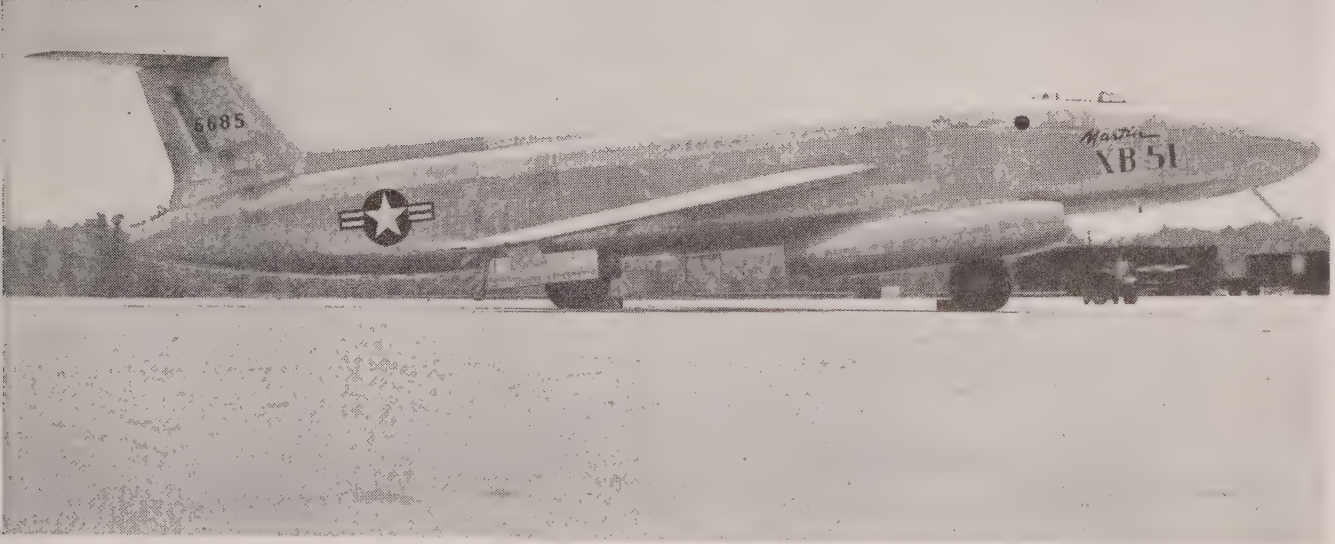


FLOAT FITTINGS on fuselage of LC-126 were beefed up and water rudders on floats were redesigned by mechs of the 10th Rescue Squadron. The USAF's Cessna's are powered by 450-hp *Wasp* engines (*below*) instead of 300-hp Jacobs

AIR FORCE'S newest high-speed light bomber is powered by three GE J-47 turbojet units, two of which are seen here

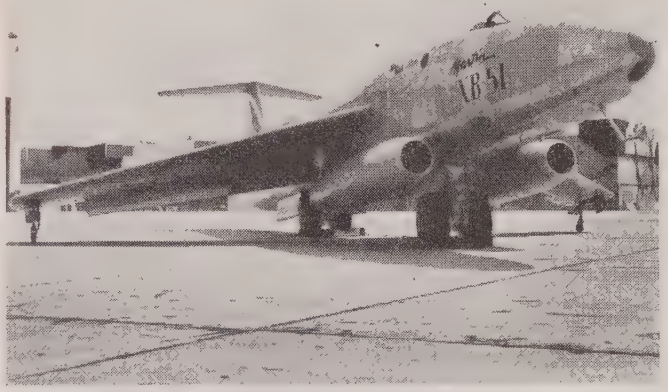
XB-51 . . . Jet Bomber

SWEEPBACK of XB-51's wings and horizontal tail surfaces are clearly visible in this high-angle view of '51



PROFILE VIEW of the new bomber reveals its "T"-shaped control surfaces and tandem or bicycle-type landing gear

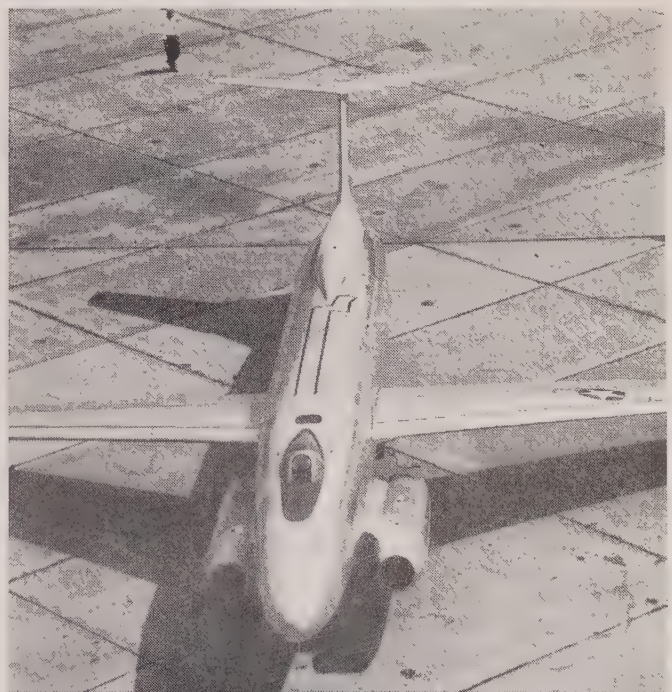
The veil has been removed from one of the most closely guarded aircraft projects undertaken by the USAF. Although only sparse details have been revealed, it is enough to indicate this new ship is potentially one of Air Force's best bombers. Designated the XB-51 and built by Glenn L. Martin Company, the ship is classified as a "revolutionary high-speed ground-support bomber." It is powered by three turbojet engines, two mounted on pylons on lower side of fuselage near the cockpit, and the third in the rear of the fuselage. The thin, high-speed wings of the '51 are swept back at an angle of 35° and have a span of about 55 feet. The fuselage is 80 feet long, The horizontal tail surfaces also have a 35° sweepback. Lateral control is provided by "spoiler-type" ailerons. The bomber's landing gear is bicycle type developed by Glenn L. Martin Co. It is AF's first three-jet bomber.

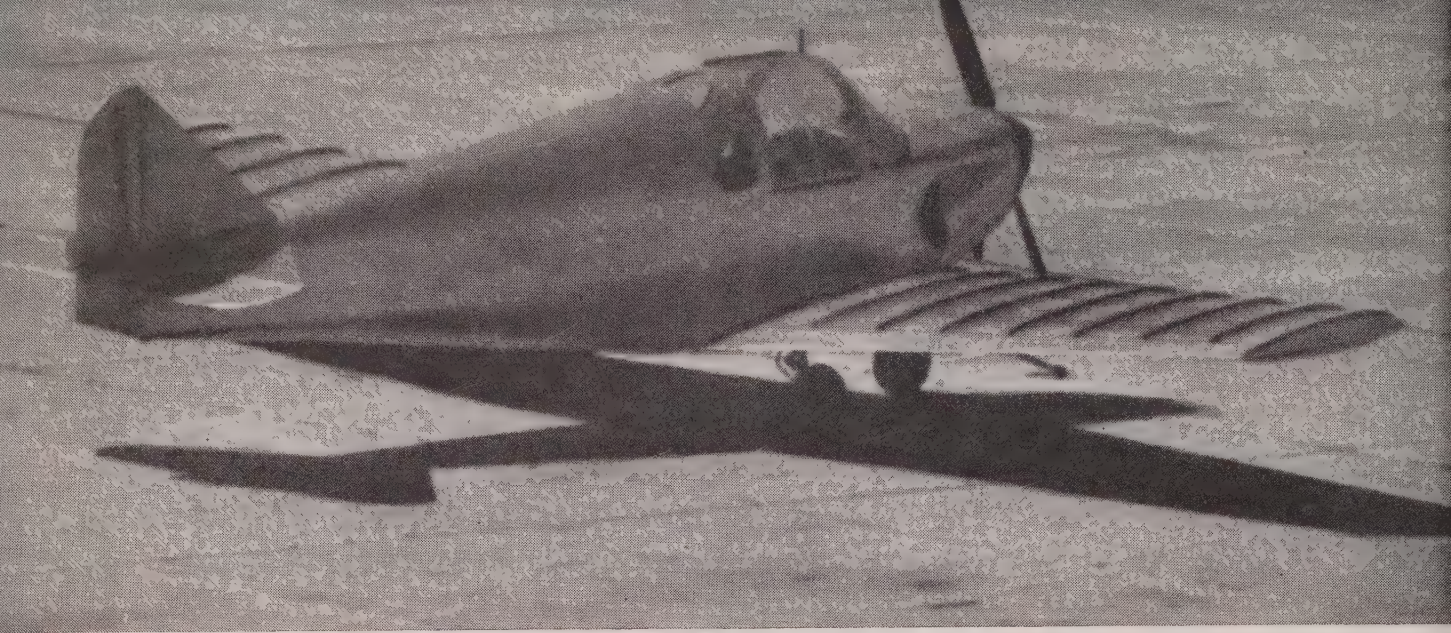


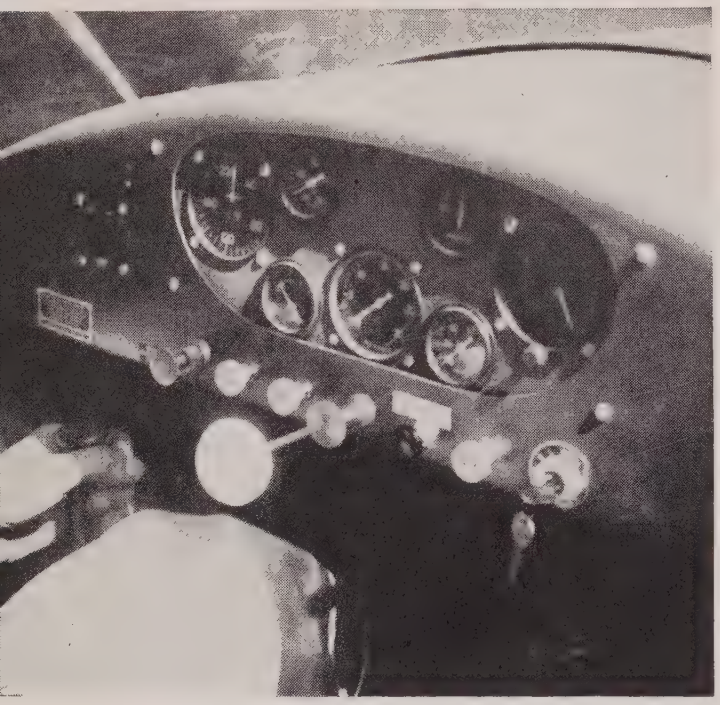
TURBOJET engines are mounted on pylons on underside of fuselage; third is in rear. Note outrigger wheel on each wing

"T"-TAIL construction and XB-51's third J-47 jet unit are emphasized in this rear-view photo of the bomber

COCKPIT of the ground-support bomber houses two-man crew, is air-conditioned, pressurized, has ejection-type seats







EMIGH TROJAN features external rib bracing on the wings. Contrary to opinion, this external bracing does not make ship unsafe to slip. Plane's instrument panel (*left*) was designed for economy, simplicity and pilot efficiency

Fly the TROJAN

Two-placer proves itself easy to handle and built to take it

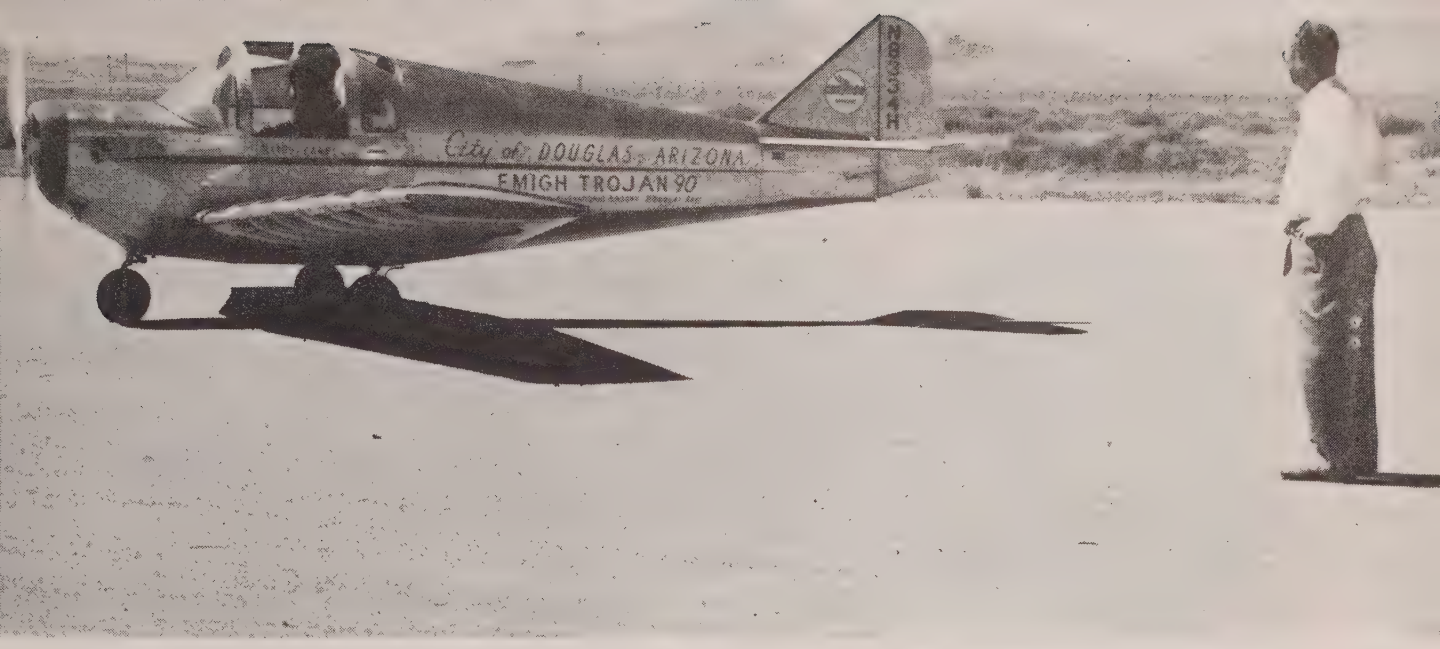
By MARDO CRANE

PROBABLY the best way to get to know an airplane is to "live with it" on a cross-country . . . and some 5,000 miles of flying really made the Emigh (pronounced a'mee) *Trojan* and your reporter good friends. This friendship started when I took the new *Trojan* 90 on a transcontinental tour from Douglas, Arizona to New York City, and back again. Certainly that junket with its stops at 35 different airports proved to be a good test hop for the little two-placer.

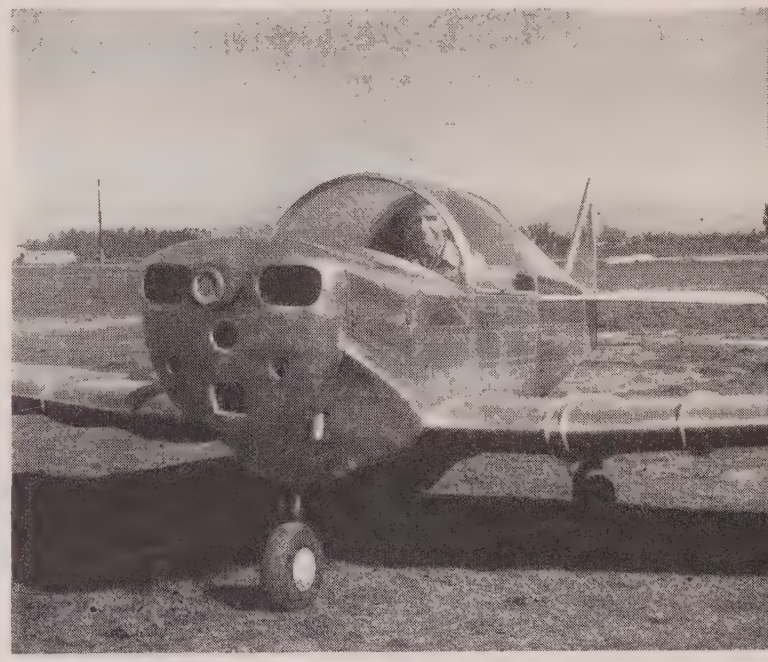
If you haven't seen the *Trojan* yet or haven't flown it, you have a treat in store for you. The ship is a clean little all-metal job powered by a 90-hp Continental engine. It has a wing span of 31 feet, 10 inches, and is 20 feet, 3½ inches long. And believe me, not only does the *Trojan* look sturdy but it is—I dropped it in a couple of times and it took the rough landings without a kick.

Looking over the ship, one of the first things you'll notice about it is the external rib bracing on the wings. Odd though this bracing may seem, it doesn't detract from the looks of the ship and it does add lift and greater stability. And don't let anyone tell you these external ribs make the ship unsafe to slip! I slipped the *Trojan* into several airports, and the maneuver was both easy and entirely safe.

Many of the design features of this two-placer have been dictated by a desire for economy in construction—an economy for the owner as well as for the builder. The plane's full wing-length ailerons, for example, were an economy move and



COMPANY producing the *Trojan* has weathered several business downdrafts, and is now building planes at rate of one a week, thanks to city of Douglas, Arizona. Prototype *(right)* was built when Emigh Co. was in Los Angeles



one that pays off. With them, the *Trojan* offers complete finger-tip control right down to the ground. And for the pilot who likes a plane with plenty of "feel" in it, the stick-control *Trojan* is his baby.

The tricycle landing gear on the ship gives you a low-down-to-the-ground feeling that you have to get accustomed to, especially if you're more used to flying bigger stuff. But that gear does what all tricycle gear does . . . makes landing a lead-pipe cinch. And the steerable nose wheel makes for easy taxiing, too. As far as ground-looping is concerned, I'm convinced the *Trojan* won't unless you deliberately steer it into one. On my cross-country, I went into several fields where crosswind landings had to be made . . . and under very gusty conditions. The ship went in without a balk and there was never a sense of I-wonder-if-we'll-make-it. Control was absolute and sure.

On a normal landing, you bring the ship in on final at an airspeed of 70 mph, then start your flare-out at about 60 mph. That may sound a little fast, but once you've greased in, you'll find the nose wheel settles down at once, and the ship rolls only a short distance. Designer and builder, Harold Emigh claims he can take the *Trojan* out and bring her in within an easy 400 feet. Maybe so, but the best I could do was 600 feet, using a touch of brake on landing.

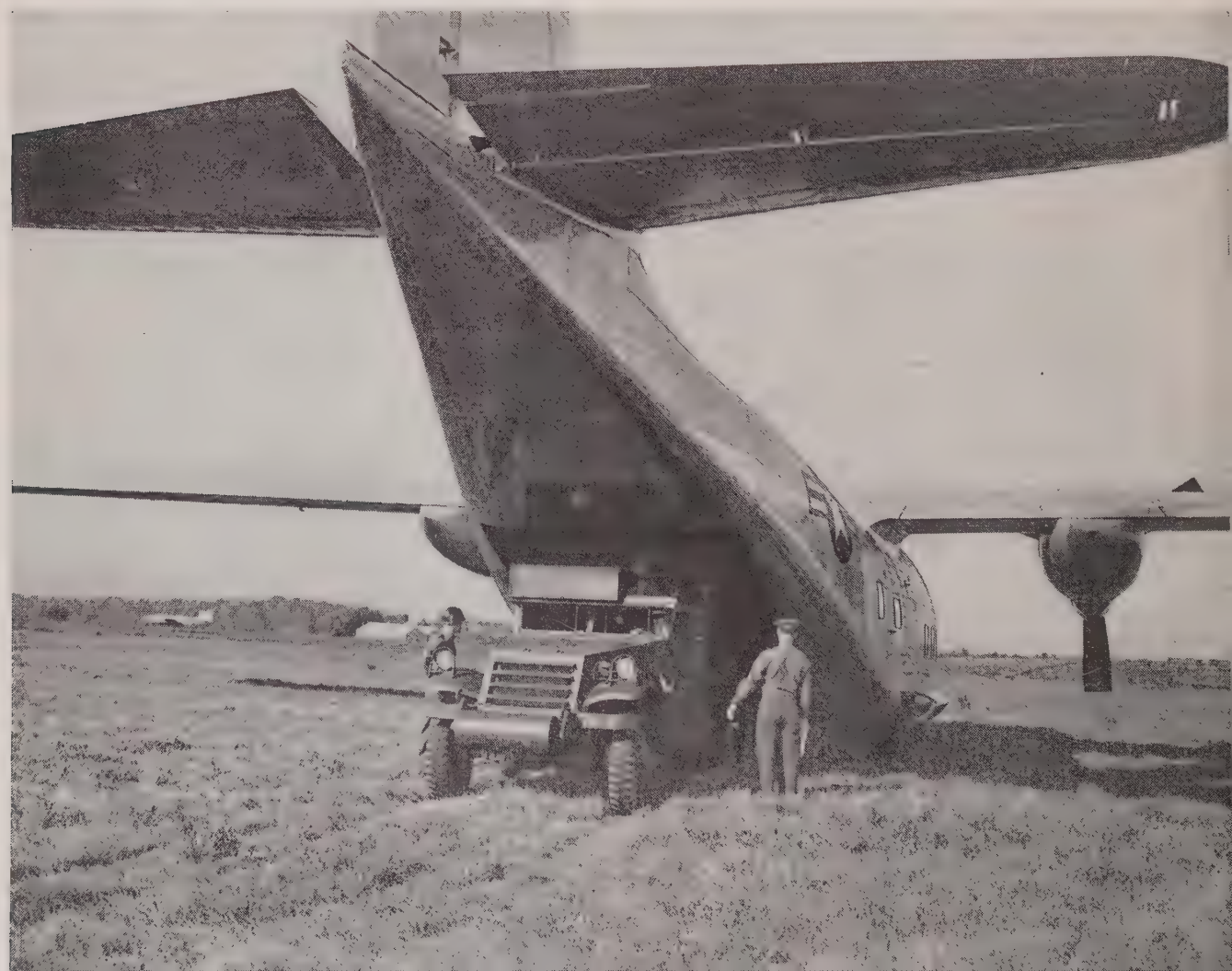
Once airborne, the *Trojan* climbs steeply at an indicated 70 mph. With and without thermal conditions influencing the rate *(Continued on page 42)*

AUTHOR flew the *Trojan* 90 on a 5,000-mile transcontinental round-trip air tour from Douglas to New York City

CHASE *AVITRUC*, designated XC-123, is a troop or cargo-carrying transport that is powered by two 2400-hp engines

Chase Avitruc

CARGO compartment of *Avitruc* has useful cubage of 3,570 cubic feet, and will carry a 21,008-pound cargo load



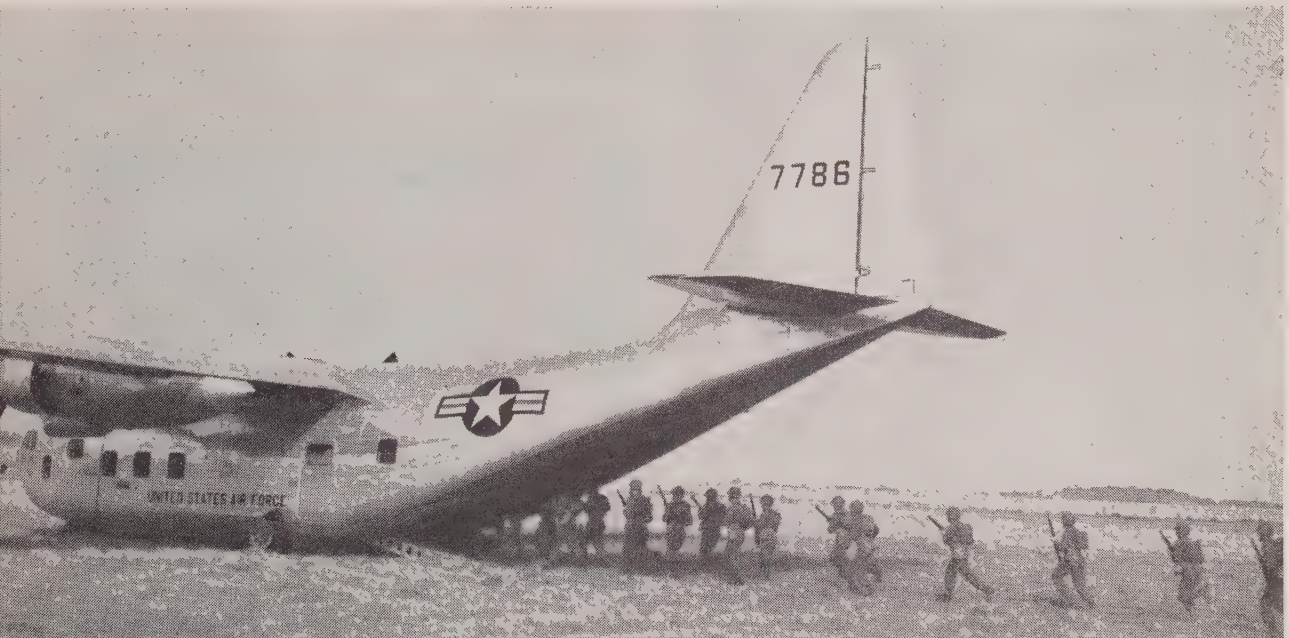
DEMONSTRATION saw the big Chase *Avitruc* get off the ground some 600 feet after it started its take-off run

AVITRUC stands 32 feet 8 inches high, has wing span of 110 feet; has maximum gross weight of 54,000 pounds

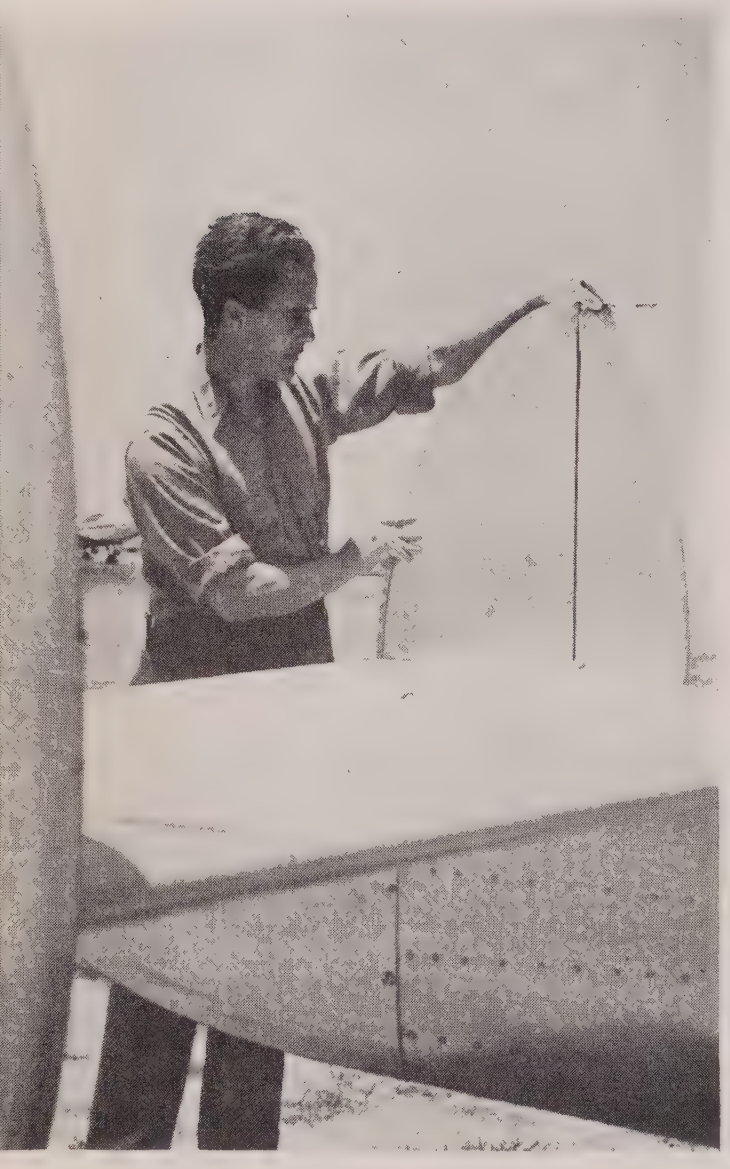
DESIGNED and built for the sole purpose of handling and delivering cargo, the Chase Aircraft Company's XC-123 *Avitruc* recently proved its capabilities in a demonstration flight at the company's field in West Trenton, N. J. Fully equipped troops, trucks, Howitzers, Jeeps and just about any other piece of battle equipment you can name were loaded into the *Avitruc* with an ease never before seen in the field of air transport.

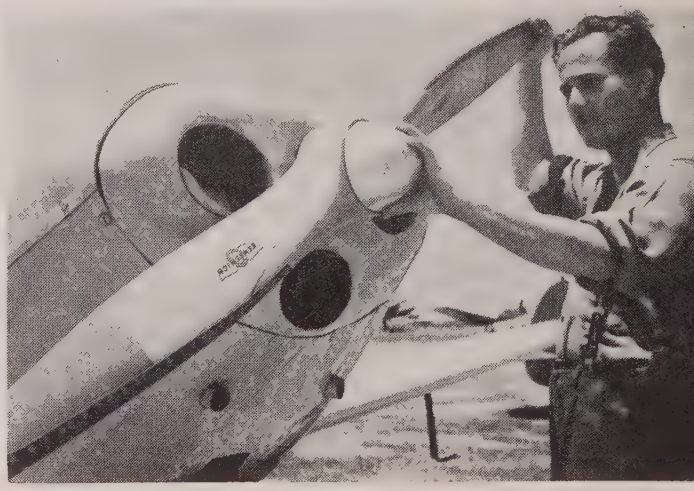
Of all-metal construction, the *Avitruc* is powered by two Pratt & Whitney R-2800 engines which give it a top speed of 250 mph, a cruising speed of 200 mph, and a range with maximum cargo, of 1,350 miles. An indication of the versatility of the XC-123 lies in the fact that the ship was designed so that it can operate as a glider, too.

PERSONNEL CARRIER, the *Avitruc* can accommodate 60 fully equipped troops; was designed to operate as glider, too



HOW'S YOUR S.O.P.?





PROPELLER that is loose is something you can't see. Good idea is to gently jiggle it back and forth a few times (*above*) to detect any looseness. Develop such routine inspection habits as testing all moveable parts for play

By GILBERT C. CLOSE

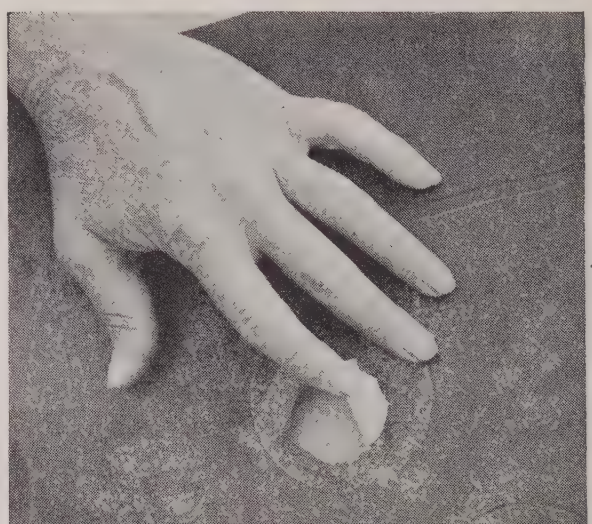
SERVICE pilots call them S.O.P.—short for Standard Operating Procedures. Civilian pilots should adopt the same procedures, and for want of better terminology, call them G.C.S.—short for Good Common Sense.

These procedures are better safety insurance than the type that pays *after* an accident. They will prevent more crack-ups than any innovation in lightplane design. They will make "good" pilots out of "ordinary" pilots, and will help give a raspberry to the public eye which still regards lightplane safety as an extremely doubtful proposition.

Standard Operating Procedures are not a list of rules to be printed and memorized by heart. They are definite acts accomplished by the pilot to minimize or defeat the hazards of flying. There is a lot of difference between reading a rule and putting it into action. The rule may warn against flying when inclement weather threatens. But that rule is of no value when the pilot suddenly finds himself engulfed in the maelstrom of a thunderstorm. In this particular case, the act of staying on the ground when a thunderstorm is approaching is the "operating procedure" that counts.

Leave it to the old-timers to attach true value to S.O.P. Colonel Roger Q. Williams—a figurehead

FABRIC TEAR, even a small one, permits moisture to seep in behind fabric, causing the surrounding dope to peel



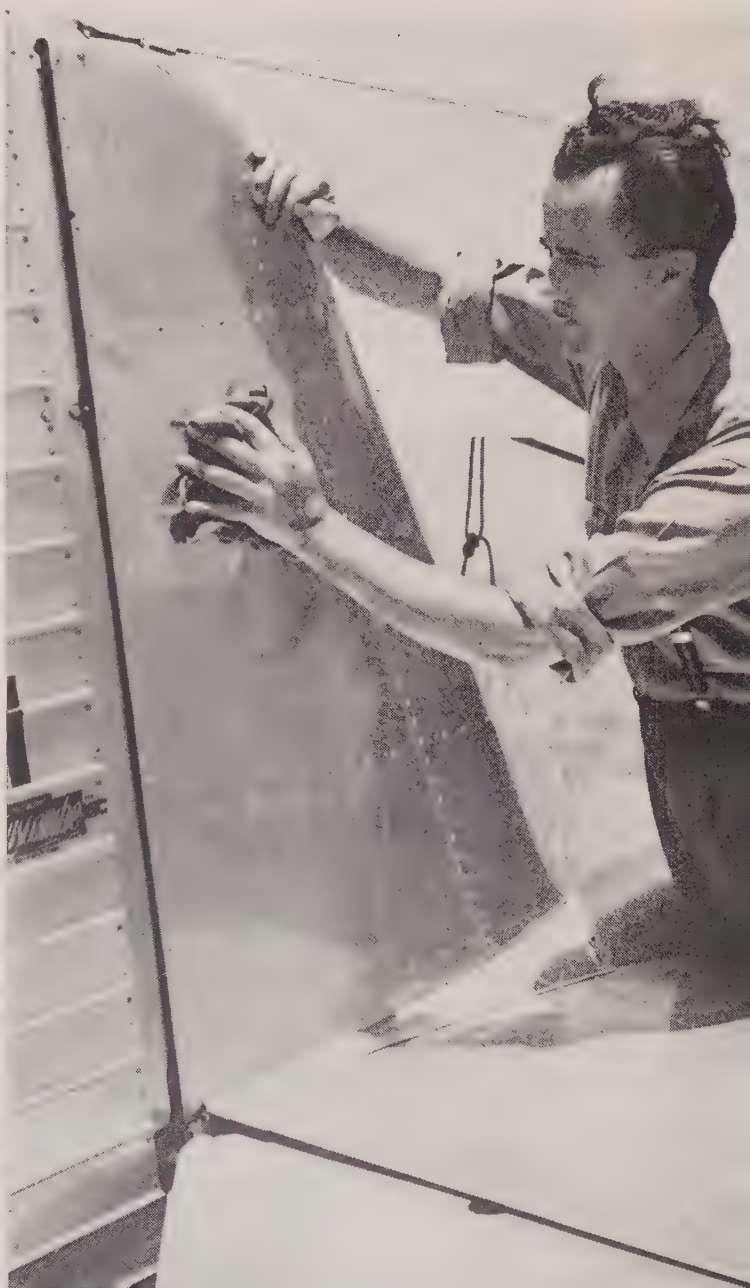
PLANE that is all-metal requires as much care as a fabric one, although metal is longer lasting than fabric. Keep your plane clean (*right*) . . . and remember that dirt can conceal a defect even from a pilot with 20-20 vision

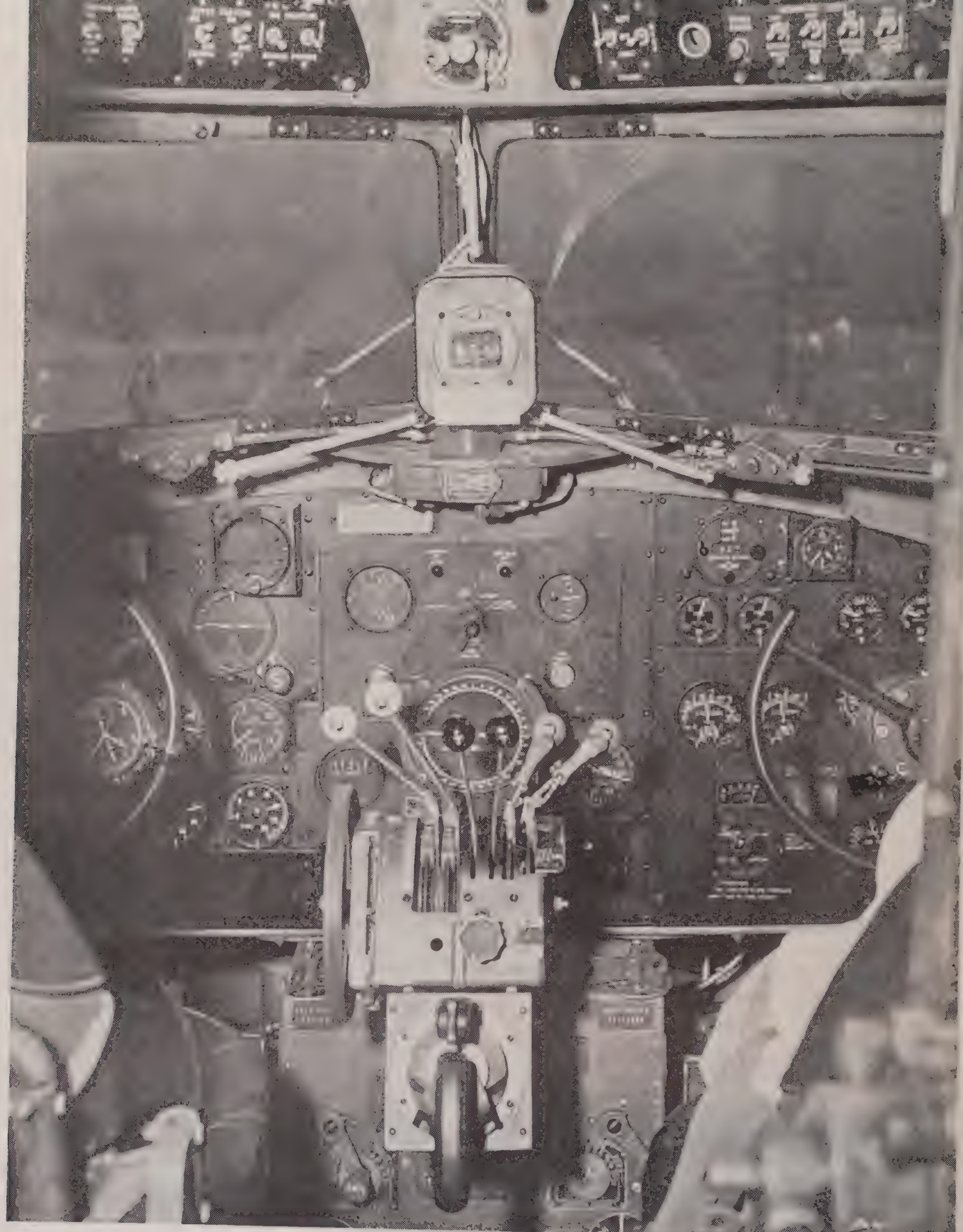
in aviation's history, who taught himself to fly in 1916, flew from New York to Rome in 1929, nonstop from New York to Bermuda in 1930, who established a world's endurance record aloft, and who has outlived most of his former buddies while accumulating 22,000 hours in the air—has this to say regarding S.O.P. in his booklet entitled "*Up Currents.*"

"A hard-crust pilot, who has logged thousands of hours in the air, has a darned good reason for things he won't or don't do, otherwise he would not have lived so long without an accident . . . It is all the result of having S.O.P. that he believes in."

Standard Operating Procedures vary with different types of airplanes. (*Continued on page 48*)

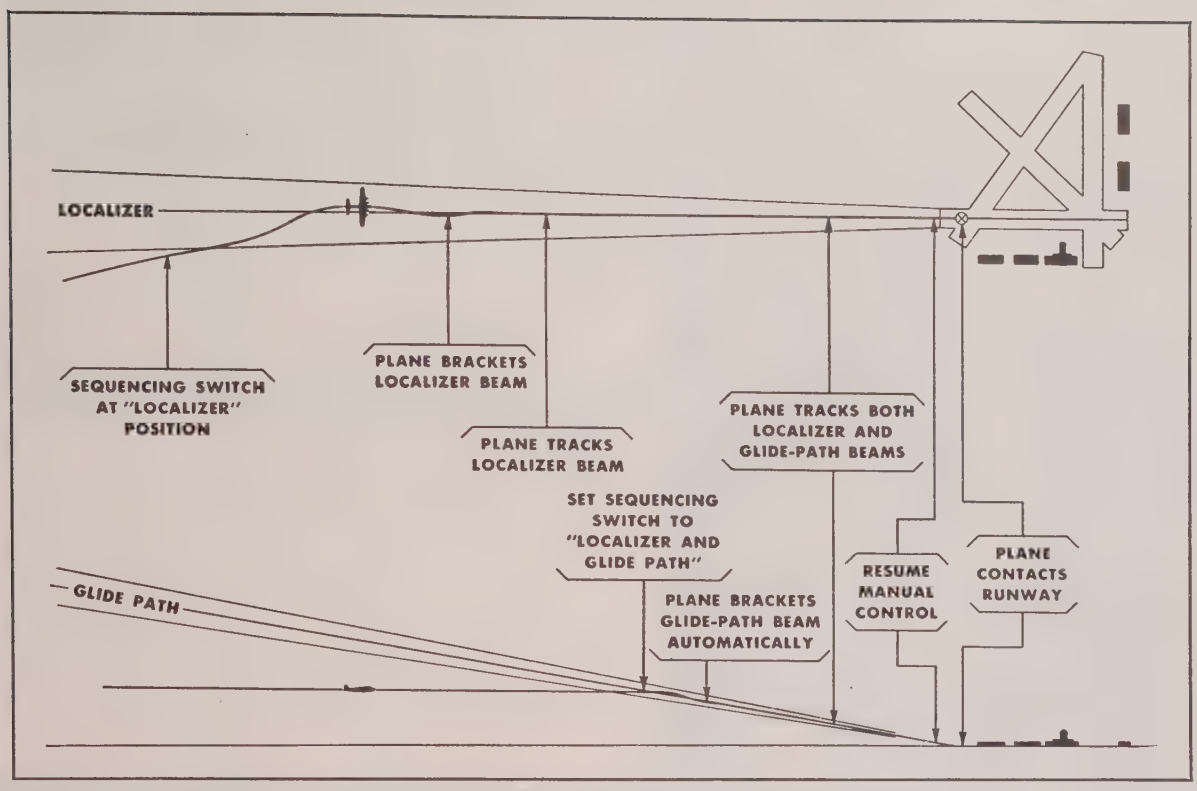
TIRE TREADS often conceal a deep surface cut. Therefore, examine your tires closely, and remove embedded rock, etc.





LOOK, NO HANDS—This CAA DC-3 approaches airport runway with no one on the controls. Photo was taken at 300 feet

Let-Down by George



FLIGHT PATH of plane in FPC operation is shown in drawing depicting two beams: localizer (*top*) and glide path

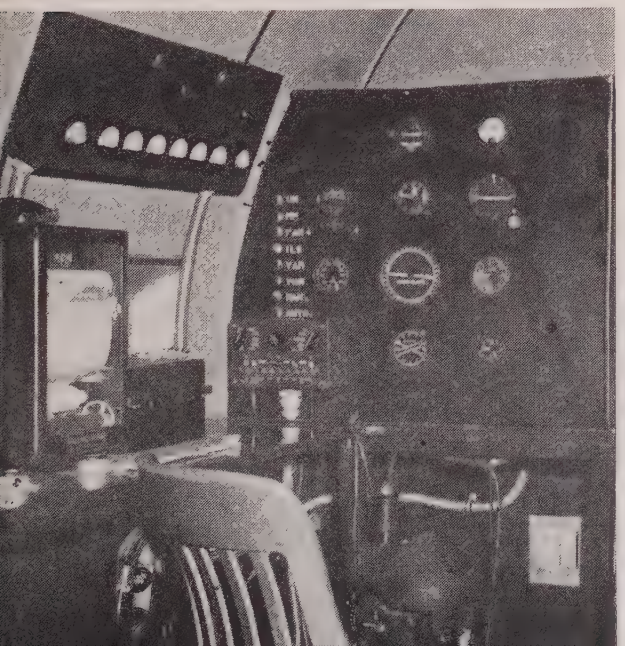
By D. N. FAIRBAIRN

First Officer American Overseas Airline

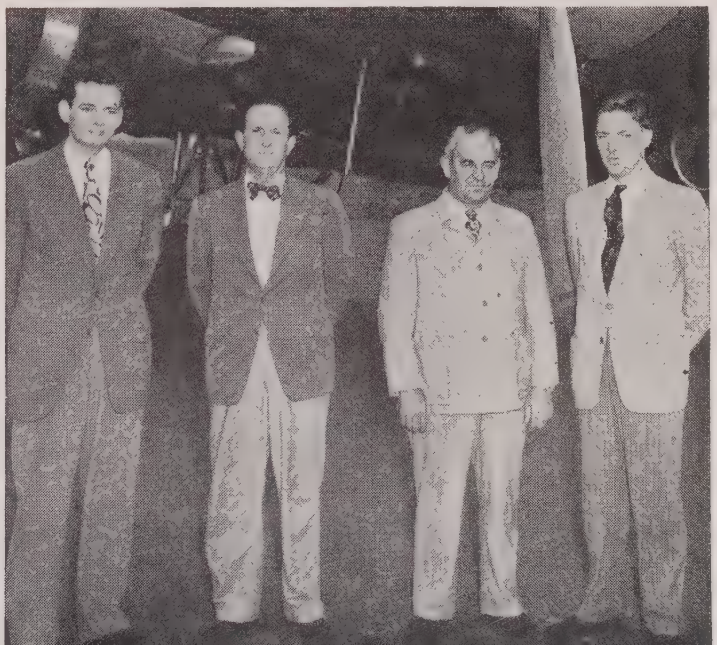
AN air show with only one plane in the air. That's what Idlewild airport had for several days in August when bad weather grounded every act but one. Although visitors caught only an occasional glimpse of the DC-3 as it descended out of the low clouds blanketing the airfield, the aircraft was actually making a succession of instrument approaches without a human pilot ever touching the controls.

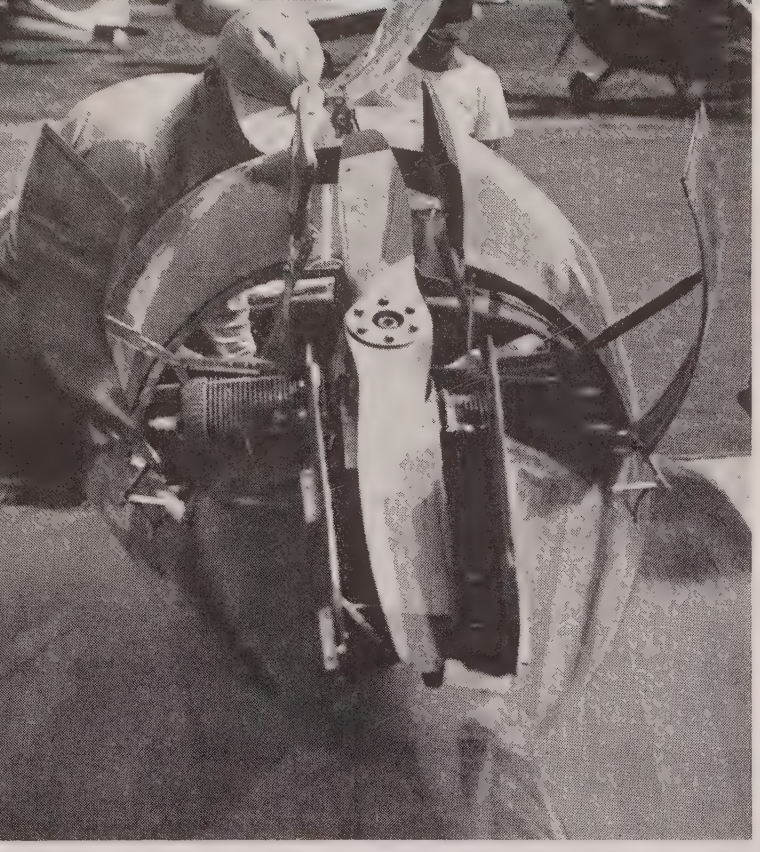
The secret is Flight Path Control, a Bendix development that links the ILS approach instruments to the automatic pilot. The ILS approach system itself is not a new development. Over 70 U. S. airports are equipped with the system, and airline pilots have been flying such approaches manually for several years. Briefly, (*Continued on page 42*)

INSTRUMENT PANEL was set up in passenger compartment CAA ship for automatic landing demonstration at Idlewild



CREW of demonstrator plane included Wm. Rogers, radio; Ed Rogers, co-pilot; Mulherin, pilot, Hodkinson, co-pilot





PUSHER ENGINE is housed in a well aft of *Hummingbird's* cockpit. Engine was designed and built by Ted Nelson

Sailplane Plus Power

By L. M. HORTON

THE care and feeding of a hobby horse has long been a chore of man. And, believe me, he'll suffer any number of inconveniences before he returns to normalcy. Unless, of course, the unusual comes along . . . as it did in this case.

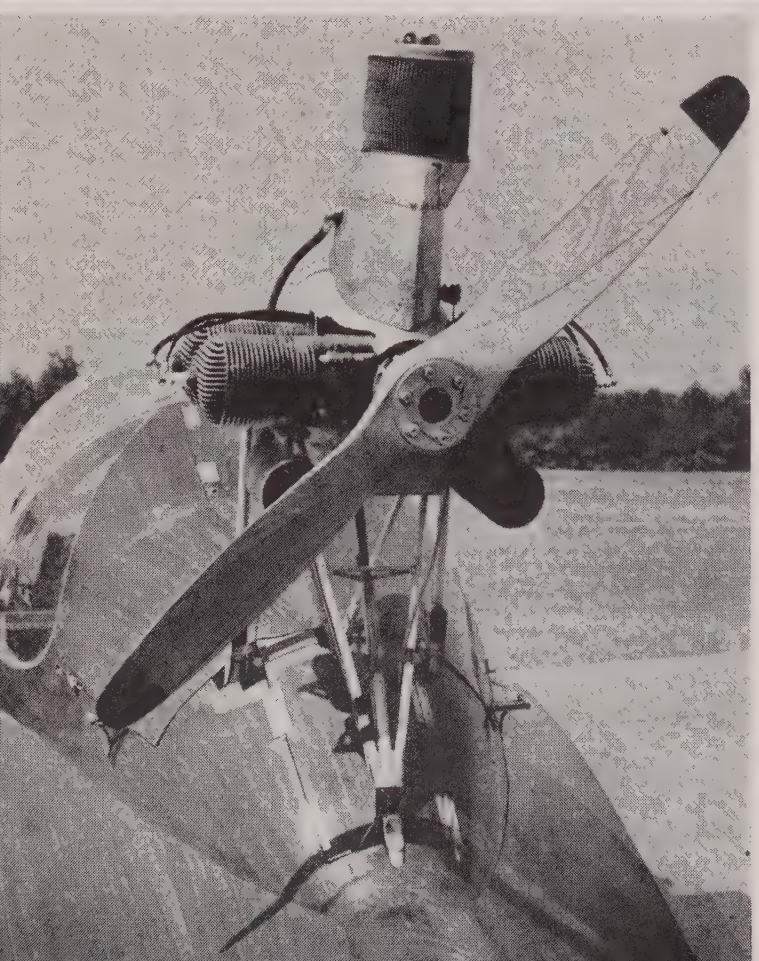
Witness a dyed-in-the-piston pilot like myself, for instance, who suddenly became bitten by the soaring bug. I'll have to admit it took several week-ends of catching tow lines, running a wing behind a car and crewing here and there before I began to place new values on convenience. That part of me that prefers sailboats with engines, ski trails with chair lifts and golf with caddies finally came to the fore, and I began to look for that easier way. I found it—a powered sailplane.

Right you are to maintain there's nothing unusual about a powered sailplane. A few of them have been built and flown in various parts of the country . . . and the flights have been successful in almost all cases.

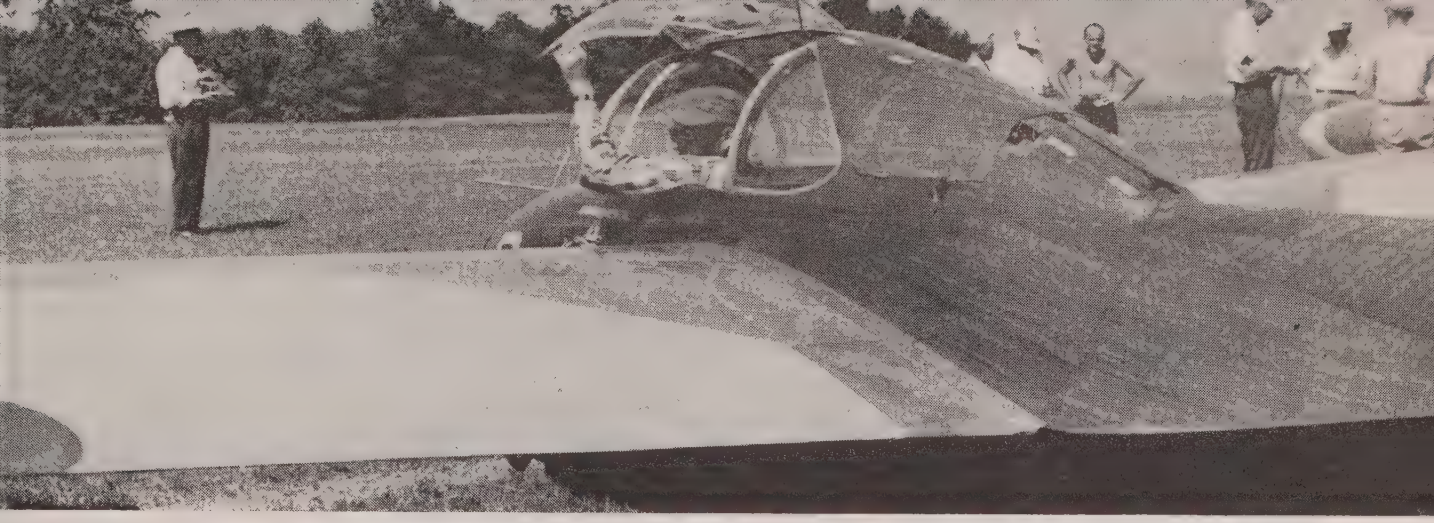
But this powered sailplane was and is unusual because in my logbook it's the first sailplane with a completely retractable engine!

Available for take-off or as extra power when needed, the engine is a 34-hp one that sits in a covered engine well just aft of the cabin. When that "extra" power is needed, the sailplane pilot gives a couple of turns on a crank and up pops the engine out of its well, all ready for running. A hand starter, similar in style to that used on outboard motors, gets the engine going—and there you are with your "extra" in power.

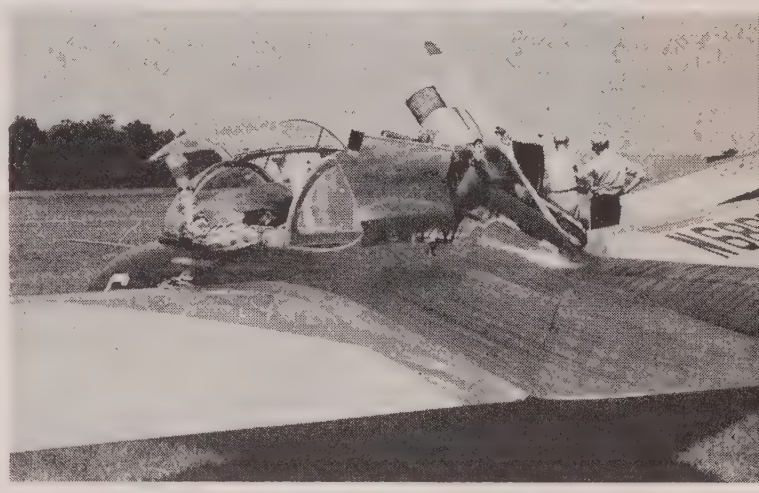
Called the *Hummingbird,* this new idea in sailplanes is in the out-of-the-ordinary category for more reasons than its having a retractable engine. Not only does the *Hummingbird* sit squarely on a fully retractable landing gear (. . . instead of

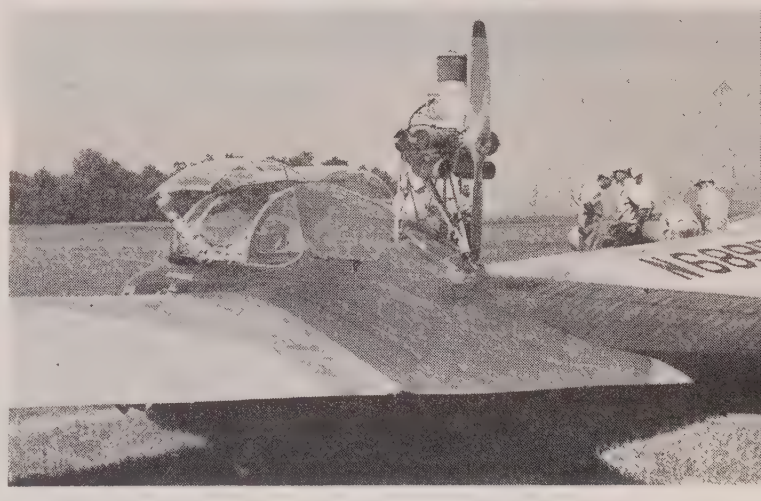


ENGINE, shown here in operating position is 34-hp four-cylinder powerplant that turns up 4300 rpm on take-off



PILOT of the sailplane raises engine to operating position by turning crank in the cockpit. Plywood doors swing open, engine raises to fully extended position; then pilot starts engine with outboard-motor type hand starter



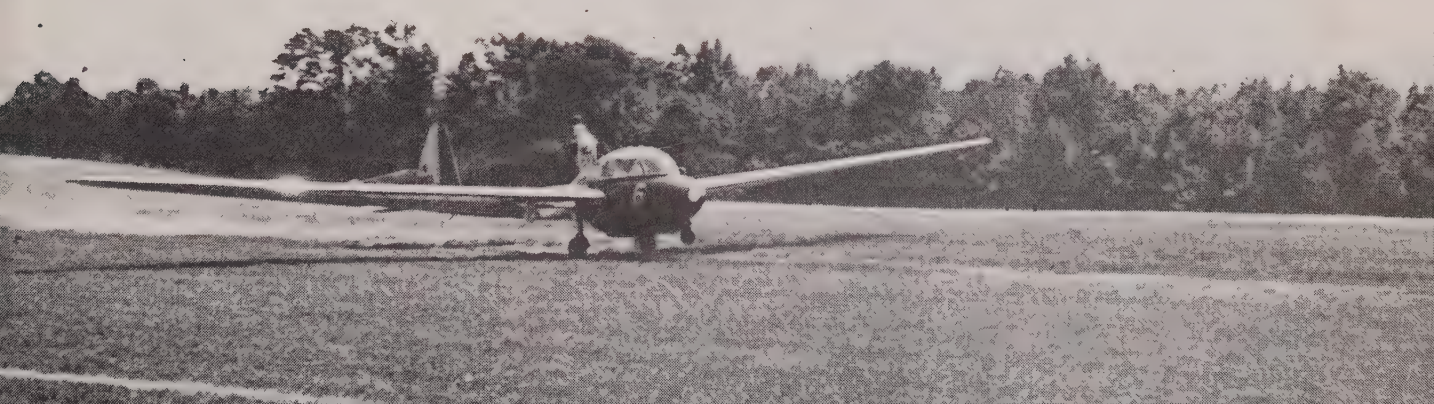


leaning lazily on a wing and wheel as most sailplanes do) but it has a steerable nose wheel, a tail skid, and a sturdy short fin on the underside of its fuselage which also permits landing in the normal gear-up sailplane manner.

Ted Nelson, designer and builder, and Harry Pearl, engineer, have a right to be proud of their "baby"—for looks as well as uniqueness of idea and performance. Taking the sleek, smooth lines of a most efficient airframe design, Nelson has, in reality, moulded a fuselage and tail assembly of mahogany plywood. The wings are metal with fabric trailing edge, and the cockpit is enclosed by a full-vision plexiglas canopy. The ship has a wing span of 54 feet, is 22 feet long and sits 9 feet high. Heavier than most of today's sailplanes, the *Hummingbird* has an empty weight of 650 pounds and a gross weight of 1,000 pounds.

Pilot and passenger sit side-by-side in the *Hummingbird's* neat cabin, and comfort is the real order of the day. There (*Continued on page 54*)

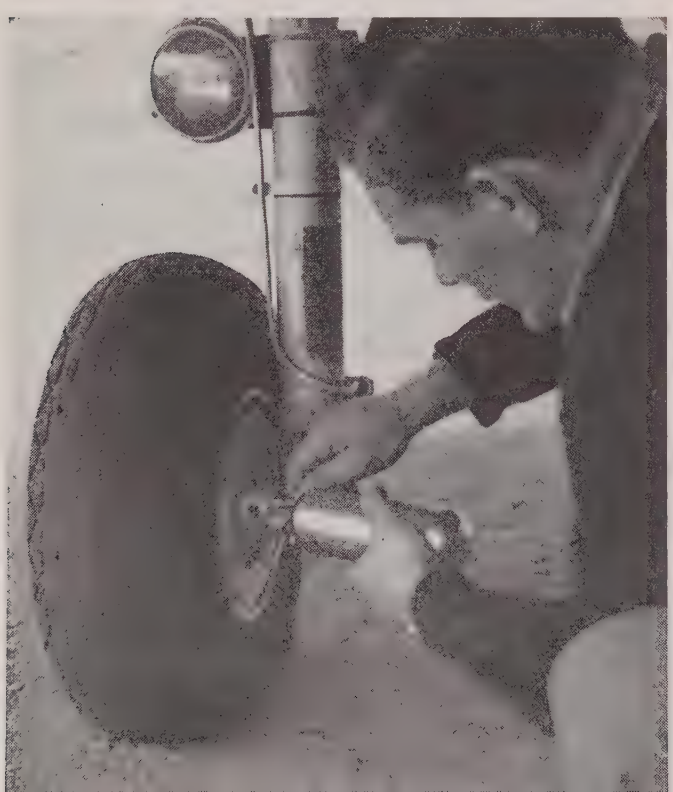
HUMMINGBIRD will take off in 900 feet at 40 mph at sea level, and will climb at a nice 285 fpm. Its top cruising speed is 65 mph and it lands, with gear down, at a mere 42 mph. Powered flight duration is about 45 minutes



Rx For Winter Flying

WINTER offers as much good flying as summer. Though some operators put ships on skis, it is usually not necessary

WHEELS that are ice encrusted can be cleaned off with a bottle-type carbon-tetrachloride fire extinguisher



By TEX SALLEE

Operations Manager, Odom Aviation Corp.

WHEN the temperature begins to drop down to freezing and the first snow falls, many private pilots decide it's time to close up shop for the winter. Around the northern states the prevailing opinion seems to be that there's no sense in going out to the airport during December, January, February and March because it's cold outside and even the birds have long since gone South.

I think the whole idea is a rumor promoted by some chambers of commerce in the deep South and in the Far West. The Weather Bureau sides with me on that because they have records of flying-weather conditions all over the country during the past few years and their observations show that *no* section on an average ever has less than 50 per cent contact flight weather during any month of the year, except under unusual, temporary conditions that may come

PRE-FLIGHT in winter should include removal of plane's wheel pants, lower tire pressure for better "footing"

WINDSHIELD should not be cleaned with a liquid during freezing weather. Liquid may freeze, distort vision

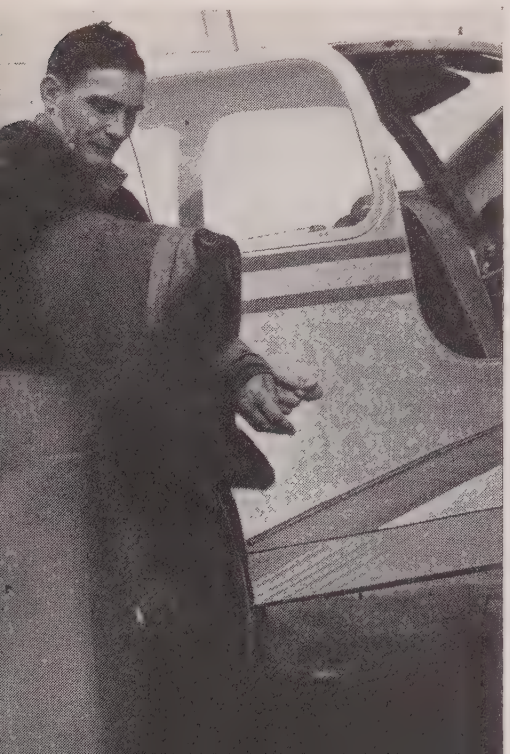
at any time, any where. That includes southern breezes and western dews that sometimes tear loose. Most states, even the most northerly, usually have over 70 per cent contact flying weather in the winter months.

No one can deny that it gets uncomfortably cold outside in the northern climes come December, but any private flyer who really likes to fly and whose home base doesn't get enough snow to change to skis can observe a few simple precautions and get as much use and pleasure out of his craft as is possible during the warmer days of the year. No, it's definitely not dangerous to fly a lightplane in cold weather, but it does call for some preparation and care.

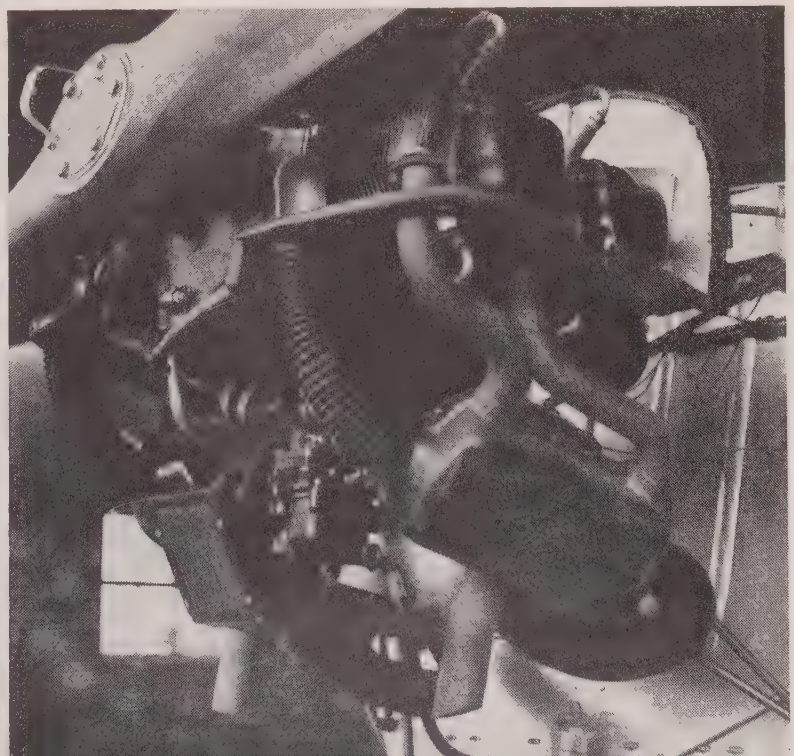
Frankly, I don't claim to be an expert, but aside from flying around the world and doing some transoceanic flying, I have piloted executive and private aircraft in every (*Continued on page 46*)

AIRPLANES flown in areas of heavy snow should be put on skis, like this *Seabee*. Skis are available for most ships

AIRPLANES that have cabin heaters are warm in flight, so don't wear bulky, uncomfortable coats while flying



CABIN HEATER muffs and exhaust manifold should be inspected for cracks that could permit deadly gas seepage



BRITAIN'S third turbojet airliner, the Handley Page *Mamba-Marathon* features passenger-approved windows

Attn: PLANE BUILDERS

By DAVID ANDERTON

DE HAVILLAND DOVE, small feeder-line plane, features large windows which permit passenger visibility

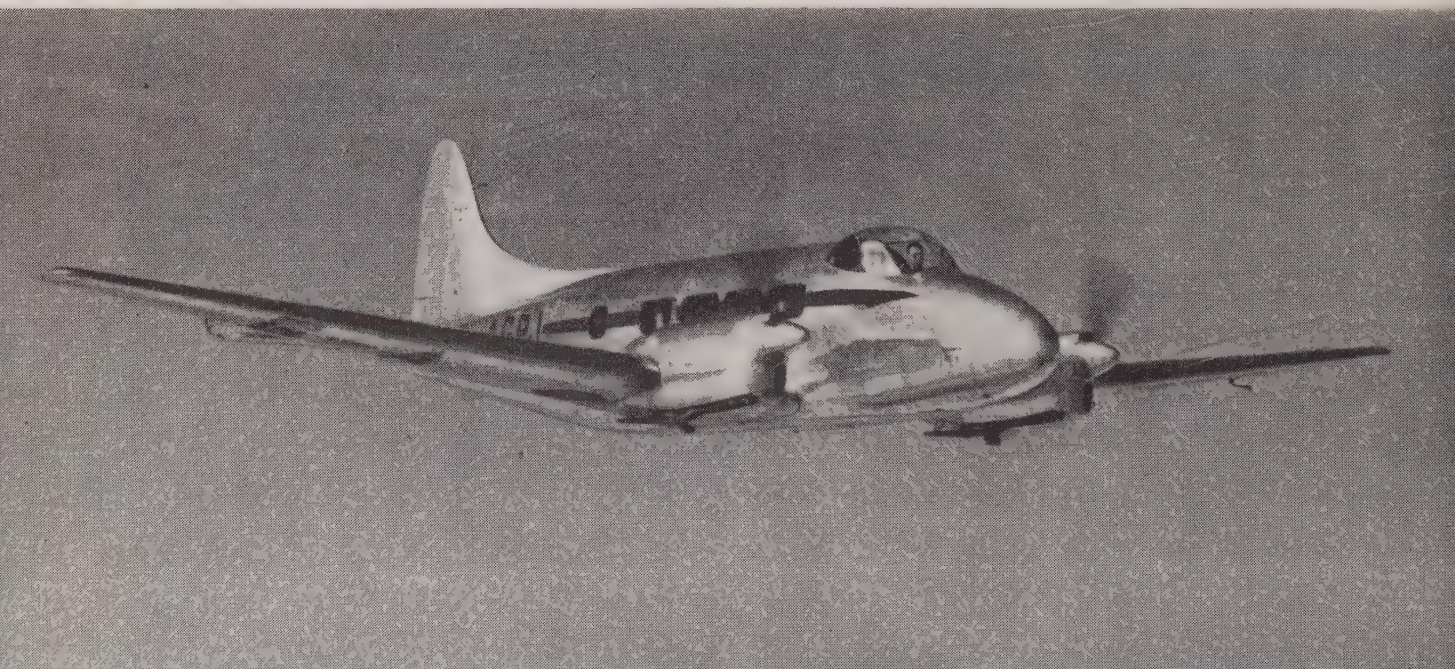
DID you ever see an ad like this?

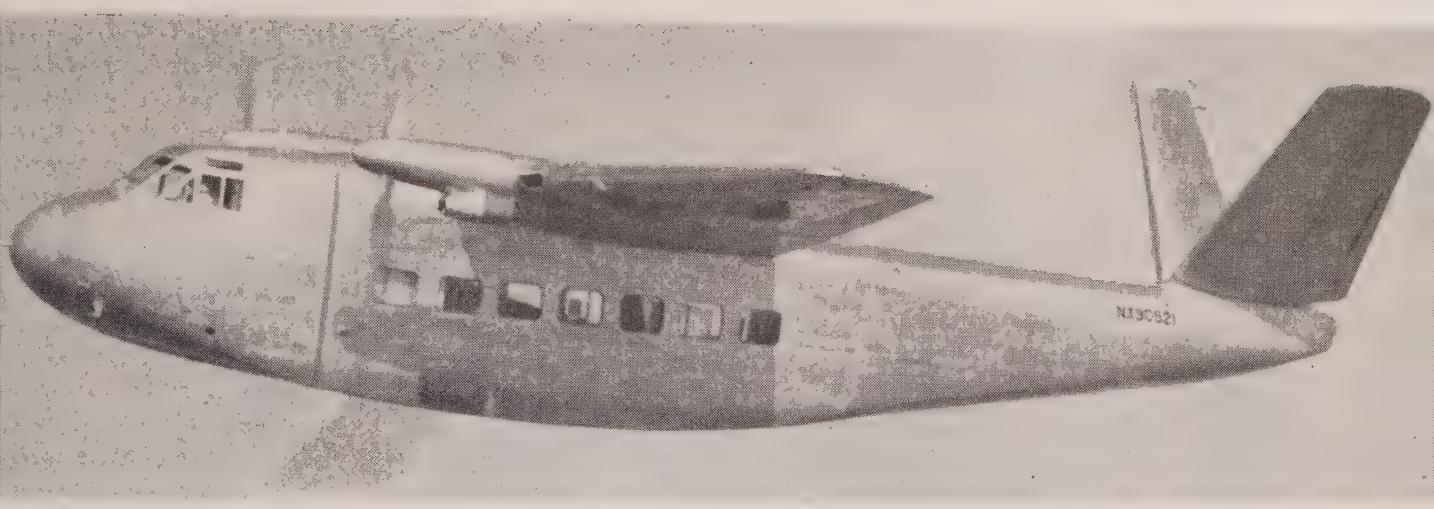
WANTED TO RENT: One-room portable house for temporary living quarters. Should have seating, sleeping, eating and toilet facilities for 40 people minimum. Willing to pay high hourly rent in exchange for comfort and view.

Screwy, isn't it? But that's the kind of an ad that must be answered by any purveyor of transport aircraft who wants to stay in business. The specifications for the one-room rental are, of course, those for the passenger compartment of an airliner.

Ever since the Douglas Aircraft Company made the big break with tradition and brought out the first American low-winged metal transport, the designers of our aerial fleets have followed down the same road, using the same ideas and lines in model after

FEEDER-LINE *Dove,* however, has low wing which does restrict the passengers' view of the ground when in flight





AIR TRANSPORT built in the U. S. that indicates consideration for comforts of the passenger is Beech Aircraft's Model 34 *Twin-Quad*. Plane's high wing and large windows permit maximum visibility in contrast to usual no-view

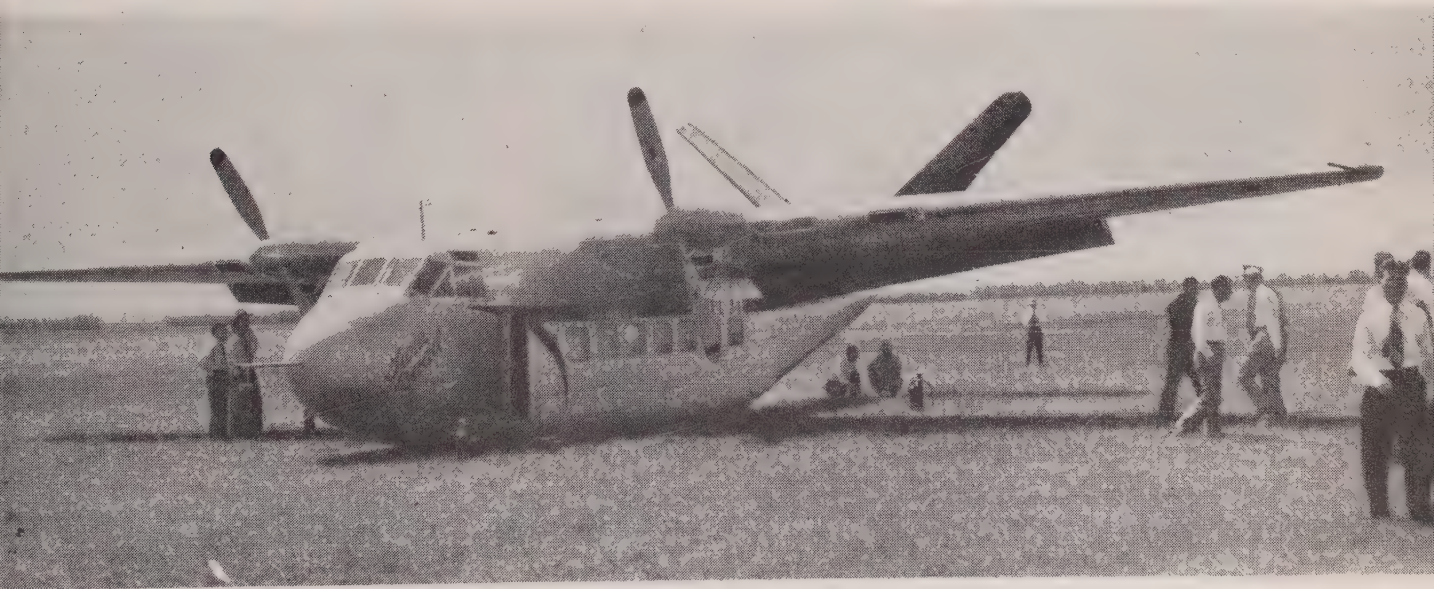
model. Over the years, this has resulted in about a two-fold increase in cruising speeds as a direct result of the installation of more power, and less drag, in essentially the same basic airframe. But we have now fallen into a rut, or at least reached a leveling-off point, and it will take a while before any great design advancement is made again. In the interim, I believe that the aircraft designers could well spend some time making passenger surveys to find out what the traveler really wants in an airplane. To save these designers some time and money, I present my thoughts on the subjects.

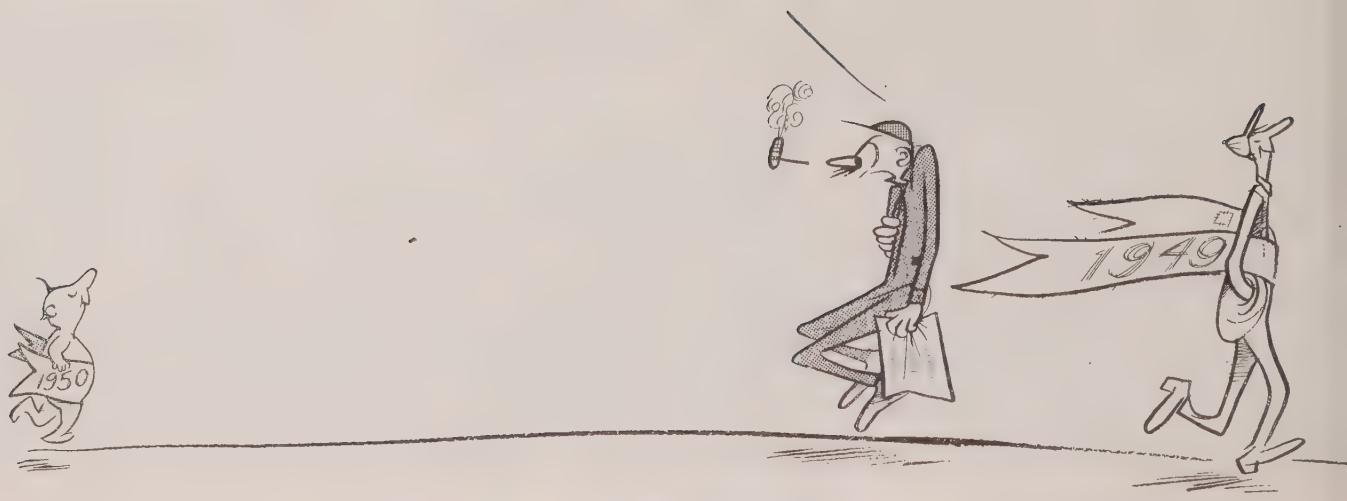
One brief biographical sentence: I am an aeronautical engineer, I ride in transport aircraft a great deal on business, and I will continue to do so whether the aircraft designers take my suggestions or not. But, please, Mr. Designer, consider me and the rest of my fellow-travelers when you next lay out a fuselage. That fuselage will be my home away from home. So, pretty it up for me . . . please?

Let's begin with the interior color scheme. Must it be limited to shades of buff and gray? Just because Detroit can't seem to find any different colors for their four-wheeled boudoirs is no reason the transport field should copy. After all, even the railroads realize the value of interior decor, and their newest equipment is beautiful indeed. So forget the many psychological studies made of the effects of color on an airsick person; if he is going to be sick, it won't make any difference whether the room is beige, buff or lavender. Besides, I never heard of anyone who ever got sick in a green living room simply because it was green.

Next, consider the view. One of the most enlightened things accomplished by architects during the past century was the introduction of the picture window, which brought the scenery right into your living room. The airlines (*Continued on page 51*)

ENGINEERS who claim low wing is safer design might consider *Twin-Quad's* wheels-up landing with no plane damage



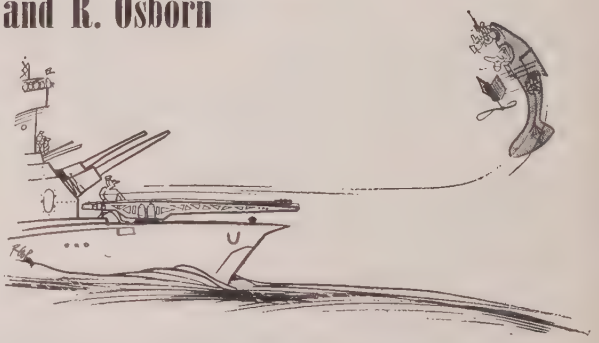


DILBERT

By S. H. Warner and R. Osborn

Tab Crash—During take-off, a large cargo plane was seen to leave the ground after an unusually short run. The tail was never raised to normal take-off position. After becoming airborne, the airplane entered a very steep climb, stalled at 200 feet with practically full power being developed, fell off on the left wing, and crashed. Even though the pilot had over a thousand hours' flight time, he had neglected to reset the elevator trim tabs after his last landing.

This sounds like one of Dilbert's dumb tricks, but it wasn't. That's one thing Dilbert is, tab conscious. He achieved that status the hard way, by almost looping a light Navy plane off the end of a battleship catapult once when he neglected to correct the large "UP" setting left on after the last landing. The only thing that saved him was that



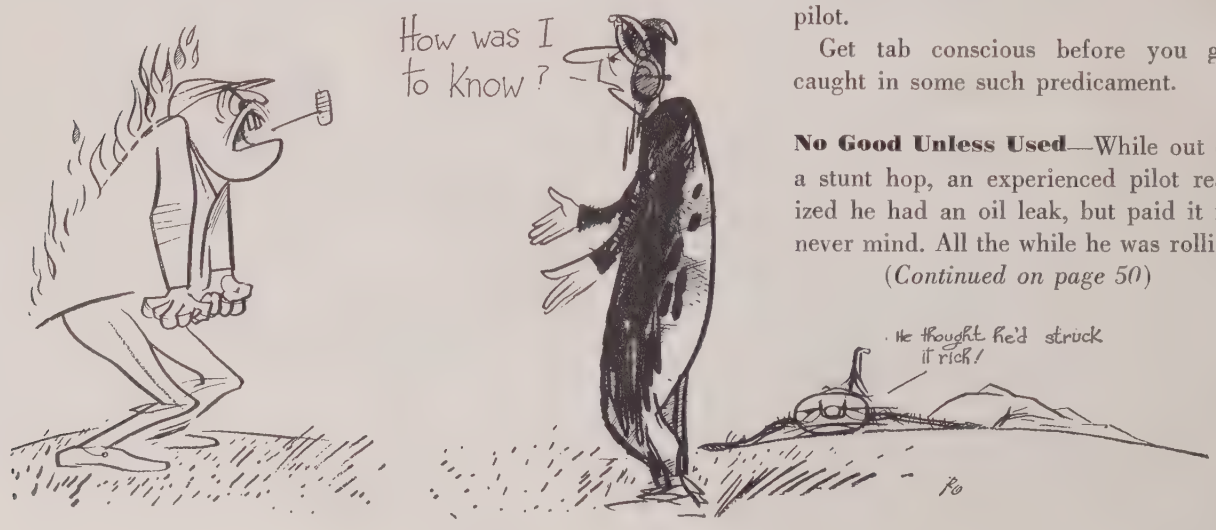
the stick forces in that plane were relatively light.

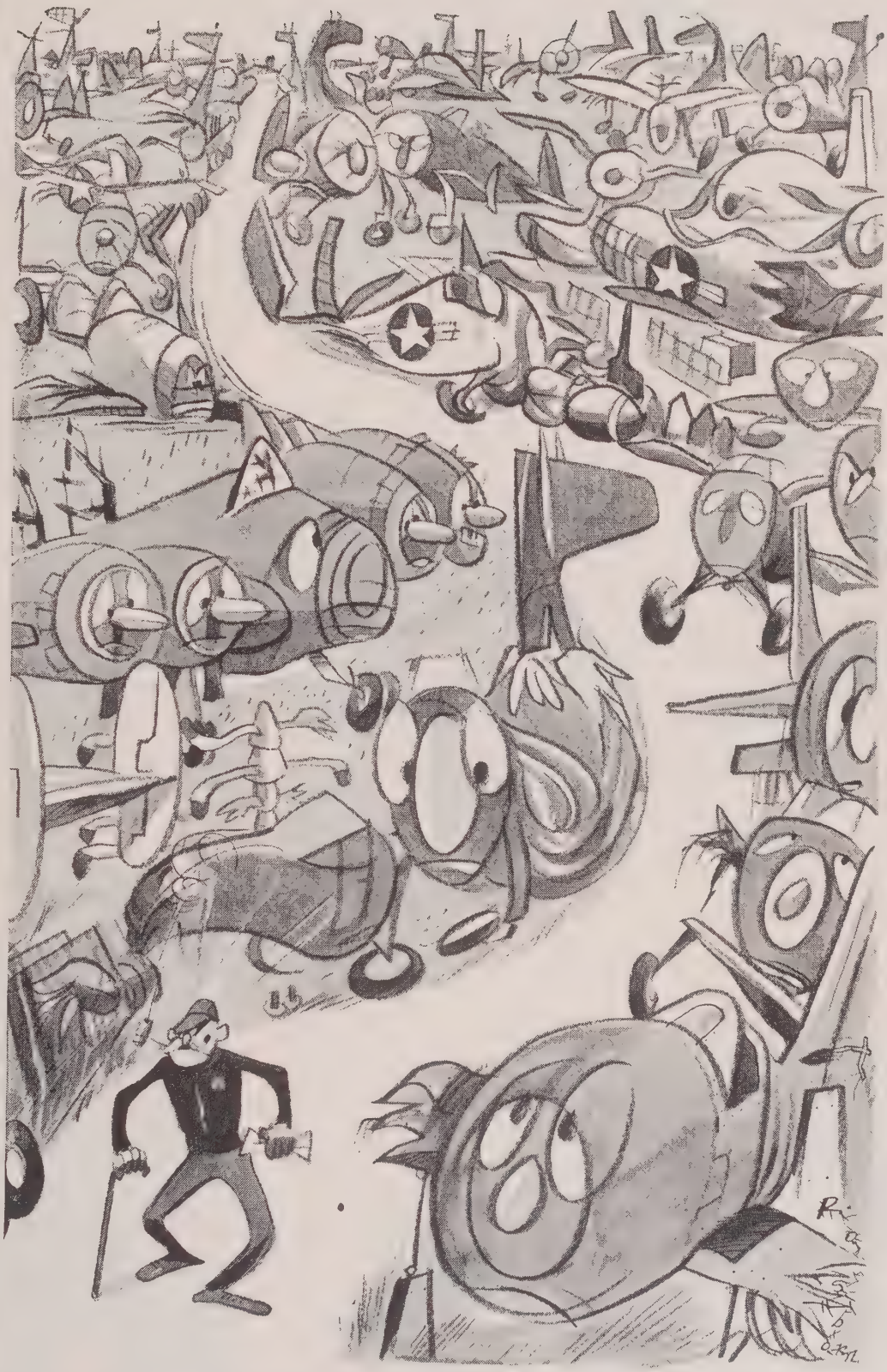
Tabs are a big help in counteracting heavy control forces, but they also can be an extra hazard if improperly set, particularly during take-offs and landing. As size and weight of airplanes have been increased, the tabs also have had to be enlarged to be effective. Consequently, tab settings on large airplanes can create forces, even at low speeds, greater than can be overpowered by the pilot.

Get tab conscious before you get caught in some such predicament.

No Good Unless Used—While out on a stunt hop, an experienced pilot realized he had an oil leak, but paid it no never mind. All the while he was rolling

(*Continued on page 50*)





"May the graveyard of Dilbert's '49 resolutions inspire you to keep yours of 1950"

Operational Engineering

Variable-Pitch Props

CONTROLLABLE or variable-pitch propellers, so-called "aerial gear shifts," maintain a proper ratio between flight-speed demands and engine-power output at their most efficient and economical levels. Changing blade pitch in the air, either mechanically, electrically or by hydraulics, according to the demand of the flight attitude—take-off, cruising, maximum power, landing—eliminates strains on the engine by providing smooth power transitions.

To extract the complete benefits of these higher priced propeller mechanisms, lightplane owners face slightly increased maintenance problems and must include additional careful checks during engine run-up and maintenance inspection periods.

Representative controllable or variable-pitch propellers available for light powerplants include the following:

Aeromatic — automatic pitch change through natural force and counterweights. Two plastic-covered wood blades. Two types: one for flanged engine shafts, approved for 65 to 165 hp; the other for SAE 20 splined shafts, 145 to 200 hp.

Hartzell—hydro-selective, uses engine-oil pressure to reduce blade pitch and counterweights to increase pitch. Two aluminum or plastic blades. Approved for up to 215 hp for SAE 20 splined engine shaft.

Sensenich Skyblade—hydraulically operated, two-position controllable pitch. Two plastic-covered wood blades. Approved for 85 to 165 hp for flanged engine shafts. Also a two-blade constant-speed model with governor approved for 112-115 hp.

Hamilton Standard—hydraulically operated two-position or constant-speed with counterweights. Two aluminum blades. Approved for up to 350 horsepower for SAE 20 splined engine shafts. Hamilton Standard's only counterweight-controllable produced for so-called lightplanes, it is best for about 300 hp.

Beechcraft Model R203 or R200—This is the only electrically controlled propeller approved and in use on lightplanes at present, and is installed on 185-hp Beechcraft *Bonanzas*. With manual electric selective pitch; it may also be converted to constant speed with a governor installation. Two steel-tipped wood blades.

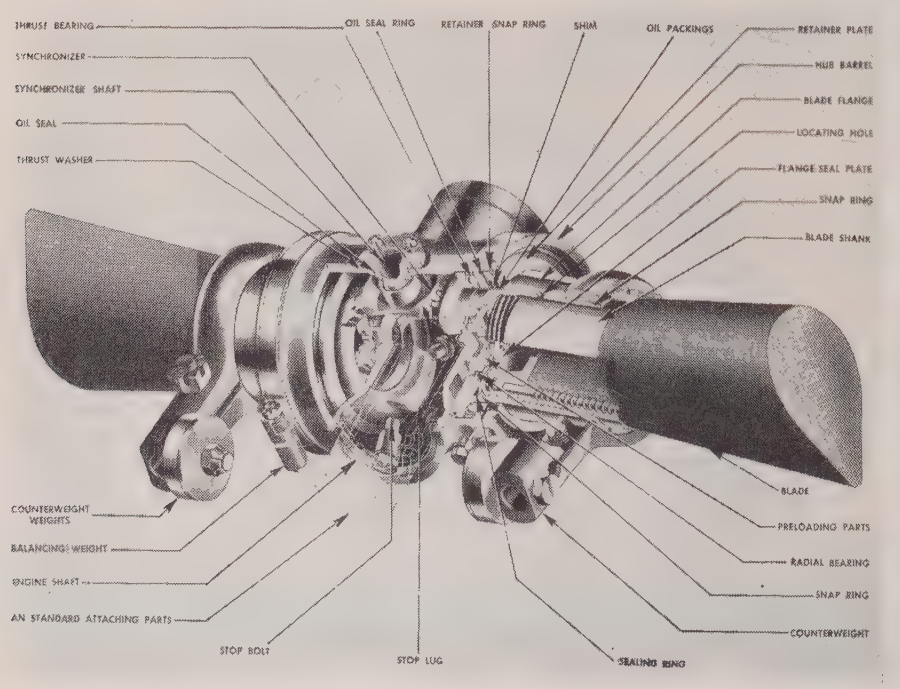
Aside from cleaning and general lubrication, which is a part of periodic inspection, work on propellers should be done *only* by licensed mechanics or propeller specialists, depending on the degree of maintenance, repair or alteration necessary to make a prop airworthy according to the CAR's. All maintenance and repair, including removal, replacement and adjustments, should be done according to the appropriate instruction manuals.

To give aircraft owners, operators and pilots a more complete picture of the importance of taking proper care and making the required run-up and periodic checks of lightplane variable-pitch props, the following is a general description taken from official manuals of the operation of representative propellers, the hydraulic Hartzell, mechanical Aeromatic and electrical Beechcraft.

HARTZELL PROPELLER. A servo valve in the propeller's cylinder-piston assembly regulates the oil flow to provide desired pitch settings within blade-pitch setting limits determined by the engine and the type plane on which the prop is mounted. The valve is manually controlled from the cabin by the pilot. When the cockpit control is pushed in, the servo valve allows oil from the engine to pass into the piston cylinder, moving the piston forward. Blade actuating links, connected to the piston, move the blades to decrease their pitch angle. When the pilot pulls the cockpit control out, the servo closes off the oil-pressure inlet and opens an outlet with a return oil line to the engine. Centrifugal force acts on counterweights attached to each blade retainer, moving the blades into an increased pitch angle. As the blades move, the blade links push the piston back, forcing oil out through the servo valve back to the engine.

The fact that engine oil acts as a hydraulic fluid in a region subjected to fairly low temperatures in the prop nose while also being heated to a high temperature as it passes through the engine makes it necessary for the pilot to observe *all* his oil-change periods carefully to insure clean oil. Oil deterioration causes gumming and sludging of the piston and cylinder mechanism in any hydraulically operated controllable-pitch prop. If it does not block its proper operation altogether, it may considerably narrow the blade-pitch change of the prop assembly. If

AEROMATIC PROP Model 220, shown here in sectional view, is used on 155 to 200-hp engines. This uses synchronizer gear between blade flanges while smaller model has synchronizer arms



HELIOPLANE, the recently developed safety ship, is equipped with an Aeromatic prop

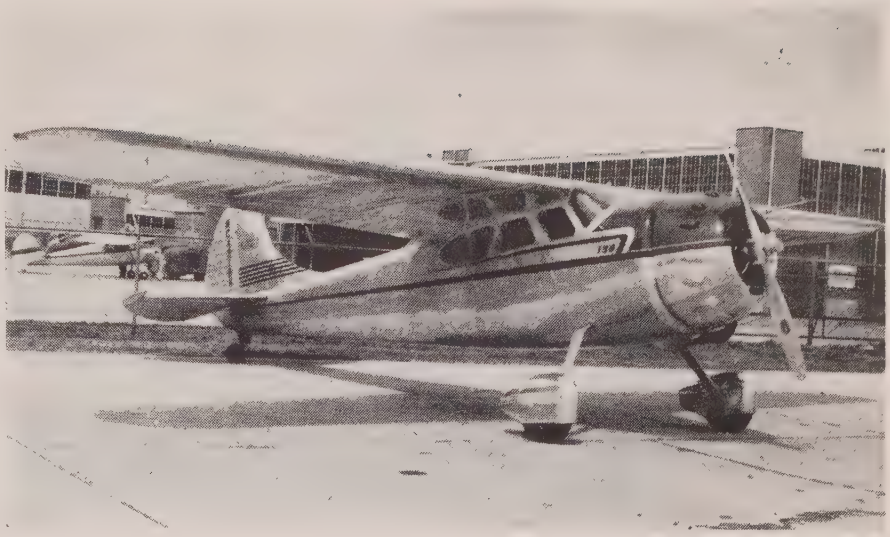
manufacturers' recommendations for air-
ne and propeller inspections are followed,
hydraulic props like the Hartzell give
uble-free operation.

AEROMATIC PROPELLER. This is the
y lightplane variable-pitch prop having
outside operating controls or linkage
her from the engine or via the pilot, the
op being wholly operated by natural forces
d counterweights aided by design installa-
n. Aerodynamic thrust, rising or falling
cording to the airplane's speed, acts as a
ch-decreasing moment along with the
ade-twisting moment, both acting against
pitch increase centrifugal force of
nterweights mounted on blade arms.
immed stops control low- and high-pitch
ge limits. The reaction of the propeller-
ade movements to changing airplane speeds
ntrols the engine speeds. Absolute clean-
ess and use of only the prescribed lubri-
nt, Aeromatic Lubricant 7F (a special
mi-liquid grease) at regular intervals,
eps the Aeromatic in top dependable
rking order.

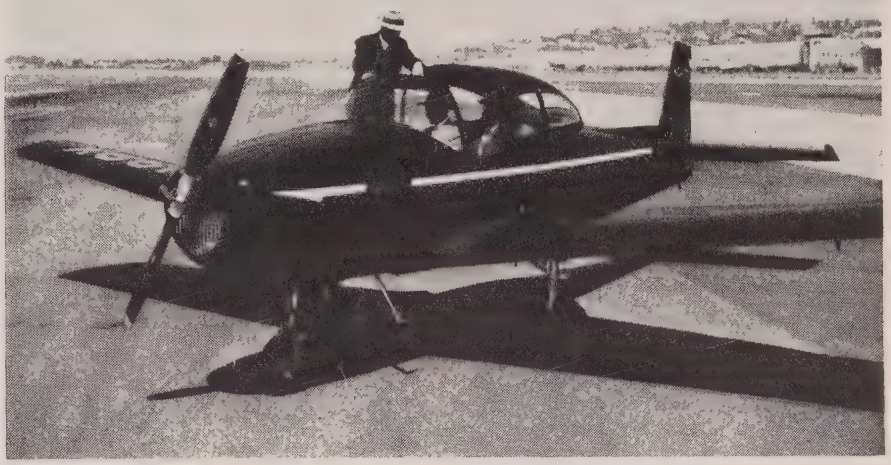
BEECHCRAFT PROPELLER. The pitch-
ntrol mechanism of the R203 is actuated
an electrically driven gear and pinion.
e pilot operates the motor control by
ans of a toggle switch, selecting his
sired setting by moving the switch to
H RPM" to decrease pitch and to "LO
PM" to increase pitch. After the prop
ades reach the desired pitch setting, the
ggle switch is returned to the middle
utral position and a prop brake holds the
ades in position. The electrical propeller
the one type of those mentioned that does
t require starting the engine to change
e prop-blade angle for checking on the
ound. The electrical installation required
operate the propeller includes an increase-
m relay, a decrease-rpm relay, a dynamic-
ake relay, two limit switches, circuit
eaker and motor. The propeller blades are
tuated by arms that are controlled by
ew threads on the inside of a drive gear
hich gives positive control of the blades.
rvice troubles and remedies, of the type
hich may affect any electrical installation,
e completely covered in the *Bonanza*
intenance manual.

GENERAL INFORMATION. The Hartzell
opeller Company is now producing its
dro-selective pitch prop with all-metal
ades for the 1949 Ryan *Navion*. Increased
rformance, proved by flight tests, and a
nger service life are the advantages of
is higher priced installation. Other manu-
cturers are expected to follow suit, depend-
g on the demand.

Engine run-up checks for all variable-pitch
ops should be made at full throttle with
op control at increase rpm setting for full
w pitch. Static rpm on the ground should
t exceed settings recommended by the
rticular aircraft manual. Adjustments
ould be made according to the manual
ly when the static rpm exceeds or is lower
an recommended settings. Flight rpm
eck of any variable-pitch propeller should
made in full-throttle, best-power climb
th the propeller at full low pitch at the
rport altitude. The latter is to give the
st take-off performance at the home airport
itude. Take-offs at lower than adjusted-
altitudes may result in engine overspeed
not controlled. Adjustments to correct the
ter condition are not necessary unless the



CESSNA 190 is fitted with the hydraulically operated two-position or constant-speed Hamilton Standard prop, approved for up to 350 hp for SAE 20 splined engine shafts; is best for 300-hp



RYAN NAVION utilizes Hartzell variable-pitch prop, using engine-oil pressure to reduce the pitch setting. A servo valve in the prop's cylinder-piston assembly regulates oil flow

home base of the plane is changed to one with a big difference in altitude or if the engine consistently overspeeds above the manufacturer's recommended limit. Ground static rpm checks are no substitute for the flight check since there may be a 100 to 400 rpm difference between static and flight rpm top speeds with different propellers and different aircraft.

Before installing any variable-pitch prop on a light aircraft be sure that the performance increase will justify the added expense, and further, that the particular type chosen is designed for the horsepower output of the airplane's engine. Also, the blade angle high and low limits have to be set for various types of aircraft following the recommended settings for best performance.

The guarantee for top performance with any controllable or constant-speed propeller is good care and expert maintenance.

That windmill sitting out there in front of your airplane (and in some cases in back) is a mighty important piece of equipment. It costs $$, so look after it. J. Leichter

BONANZA uses Beechcraft electrically controlled prop; has manual electric selective pitch

C.A.P. News from Hq.

Arizona Rescue

Tucson, Arizona. Echoes from the old West mingled with the 20th century roar of an airplane recently when a CAP plane spotted a 54-year-old cowboy and his horse who had been lost on the Arizona desert for three days.

The Civil Air Patrol was called into action after several days had passed without word from the missing man who had ridden away from Sentinel on the Gila-Bend-Yuman Highway. The cowboy, Claude Stamps, was riding along, his supply of water and crackers nearly gone, when the CAP plane flown by Capt. Bowen Kindred and Bill Martin located him. Three planes took part in the search.

Fish Patrol

Mobile, Alabama. At a recent Alabama Deep Sea Rodeo, operated from Dauphin Island, the Mobile Squadron of the Civil Air Patrol did double duty by patrolling the seas to report possible distress in case any of the competing fishing craft got into difficulties, and by providing transportation to the mainland to enable newspaper reporters covering the rodeo to catch their paper's deadlines.

One L-4, piloted by CAP Lt. Eric Sims, flew an emergency blood plasma flight from Mobile to Hattiesburg, Mississippi, to the island when one of the fishing boat captains was threatened with blood poisoning as a result of an injury to his hand. The mission was accomplished in record time despite a 20-mph headwind.

Members of the Mobile Squadron operated from the island throughout the three-day fishing tournament, one of the planes taking off each hour to scout the surrounding sea areas.

Record Operator

Worland, Wyoming. Nearly 10 per cent of the total population of Worland, Wyoming, once a famous oil-boom town, has joined the newly activated Worland CAP Group. Commander of the Group is Acting Major Eddie T. Mileski, a Group Commander of the RCAF during the last war. Mileski has officially logged more than 7,500 hours of flying time, plus nearly another 7,500 hours of unofficial time.

Hats are off to Clint Rasmussen for being a leading factor in the growth of the Worland Group and the expansion of the whole Wyoming Wing. Operator of the Rasmussen Flying Service, Clint has given licenses to and licensed one out of every 25 persons in the whole area of Worland. Clint is Squadron Operations Officer.

Wing Ding

New York, N. Y. Word has been received that the CAP insignia now manufactured by Federal Supply Company, New York, N. Y., is guaranteed to be in exact accordance with the latest CAP regulations. Some months ago. National Headquarters of CAP advised the Wings that Federal-manufactured emblems were not in accordance with regulation. It seems this was due to a misunderstanding. Anyway, at the present time, Federal is complying with CAP regulation. A catalogue is available and if you want one, write to Federal Supply, 135 Henry Street, New York. The catalogue is free.

Clarksburg, W. Va. The reactivated Clarksburg Flight of the CAP has established a disaster unit. Radio equipment and medical supplies are part of the Clarksburg unit's facilities. Commanding Officer of the Clarksburg CAP Flight is Lt. Nathan Cheesman. Operations Officer is Lloyd Barr.

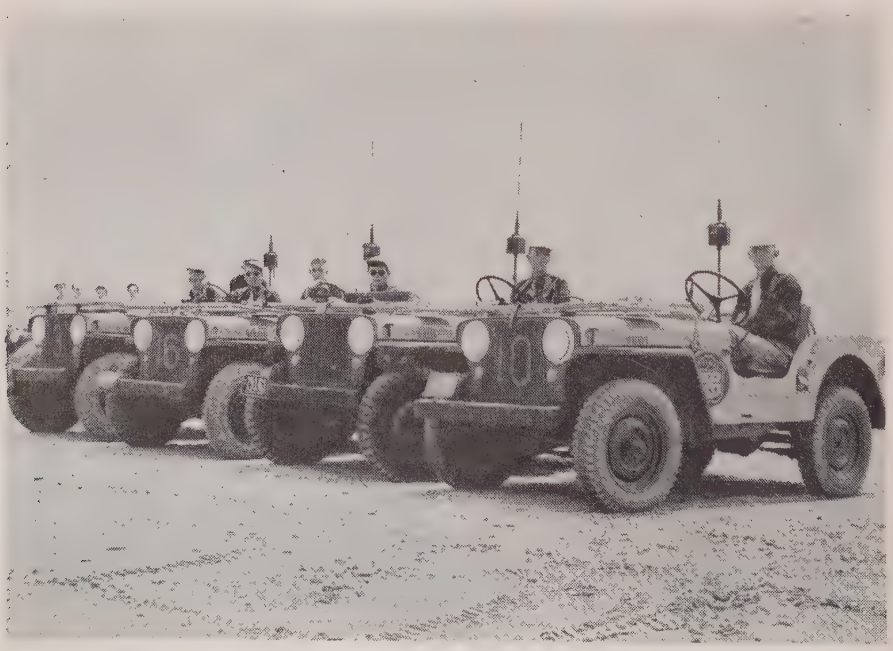
Frederick, Maryland. Grapevine system informs CAP members that CBS's Arthur Godfrey (is there another?) has become a member of the reactivated Frederick, Maryland, CAP Squadron. The "system" further informs us that Flyer Godfrey is working hard on CAP matters.

Scranton, Pa. Congrats to CAP Squadron 23's newest pilots. Recently M/Sgt. Robert C. Merriman and T/Sgt. Steven Sowka received their pilot wings. This makes a total of three in Squadron 23 having the privileges given to a CAP pilot. Lt. George Balish is the other man.

Salt Lake City, Utah. The Utah Wing of the Civil Air Patrol and the Utah "Jeep Posse" are now equipped with SCR-511 walkie-talkie radios. Via these sets, ground forces are able to keep in constant contact with pilots of CAP planes, and thus coordinate efforts in search and rescue missions over the rough Utah terrain.

The Jeeps are also being coordinated with CAP aircraft spotters for forest fire control.

SALT LAKE CITY Jeep Posse operates in cooperation with the local Civil Air Patrol units in emergency and rescue patrols in Utah. Walkie-talkie sets are used in air-to-Jeep communications



WING CMDR Capt. Wilbur Fahey here demonstrates walkie-talkie procedure to unit

NAVION normally takes 875 feet to climb over 50-foot obstacle. With Jato Junior, *Navion* clears same obstacle in an easy 300 feet

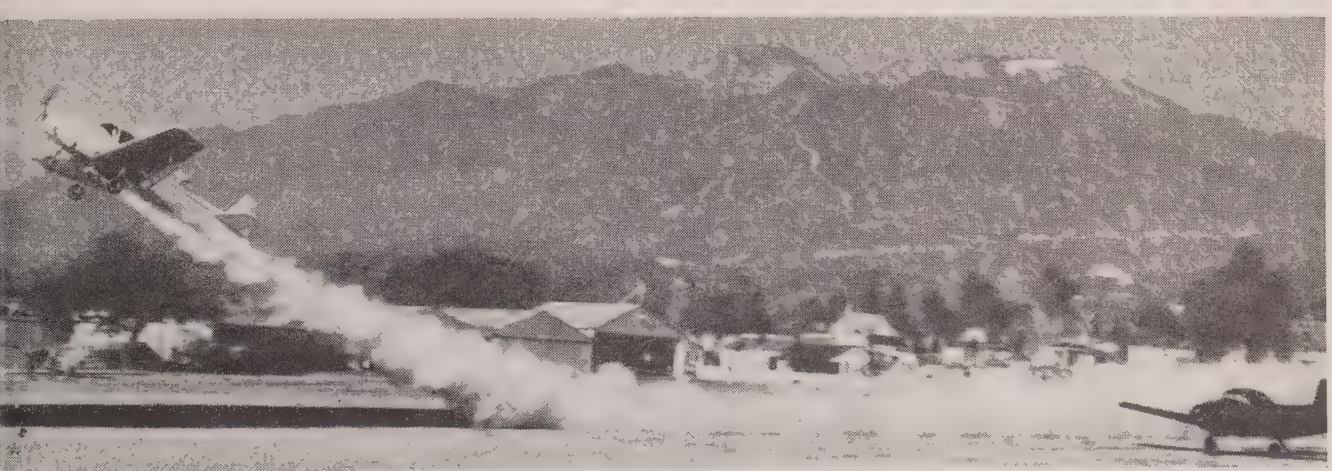
JATO NAVION

JATO JR. develops 250 pounds of thrust for 12 seconds duration; weighs 50 pounds

FEW have ever argued the take-off power of the Ryan *Navion* . . . even fewer will dispute that power now that a "thermos bottle," actually an overgrown Jato Junior, has been hung under the belly of the "pride of San Diego." Developing 250 pounds of thrust for 12 seconds, the Junior Jato gets the *Navion* up at a better than 40° angle . . . and it's an angle that sticks. You don't have to drop the *Navion's* nose down to keep her flying. The thrust of Jato Junior added to the 205-hp of the Continental engine makes it all possible.

The Jato unit is a development of Aerojet, and as soon as Jato is removed from the "Restricted" list, it will be commercially available for aircraft use.

ROCKET unit is fired as soon as *Navion's* engine is developing full power and ship has started down runway. Thrust is result of rapid burning of solid fuel propellant



CAOA REPORT . .

CORPORATION AIRCRAFT OWNERS ASSOCIATION, INC.

Corporation Aircraft Owners Association is a non-profit organization designed to promote the aviation interests of the member firms, to protect those interests from discriminating legislation by Federal, State or Municipal agencies, to enable corporation aircraft owners to be represented as a united front in all matters where organized action is necessary to bring about improvements in aircraft equipment and service, and to further the cause of safety and economy of operation. The CAOA headquarters are located at 444 Madison Avenue, New York 22, N. Y.

CAOA at CAB Hearings

The tragic accident that befell an Eastern Airlines' DC-4 enroute to a safe landing at National Airport, Washington, D. C., has produced a move to close that airport to all operations except those of the scheduled airlines.

At the CAB hearings on the EAL disaster, a protest to this move was read into the record by N. F. Silsbee, Executive Secretary of CAOA. The protest, signed by William B. Belden, Chairman of the Board of Directors of CAOA, read as follows:

"Having heard reports that pressure is being exercised to prohibit all aircraft, civil as well as military, except those of scheduled airlines, from using Washington National Airport, the Corporation Aircraft Owners Association wishes to lodge a protest on behalf of its members and other owners of company aircraft which are used for business purposes. Its member aircraft, most of them multi-engine, are flown by qualified pilots, are properly equipped with radio and other instrumentation, and have been given an 'Executive' designation by the CAA. These aircraft, therefore, are as eligible as are scheduled commercial airliners to use a Federally-managed publicly-owned airport.

(Signed William B. Belden
Chairman of the Board"

Further steps also will be taken to protect the interests of CAOA and the companies operating executive aircraft in the furtherance of industry and American business.

New Members Enroll

CAOA is happy to welcome the Essex Wire Corporation, Detroit, and Fairbanks, Morse & Company, Chicago, into the family.

The Essex Wire Corporation operates a fleet of five North American SNJ's (AT-6), a *Navion* and a *Bonanza* flying in the corporation's varied interests. Chief Pilot is ex-WASP Sally Chapin, one of the few girl pilots to hold down such a position and the first girl chief pilot in the ranks of CAOA.

Fairbanks, Morse & Company operates a Douglas B-23. This ship carries a complete instrument and night-flight panel and operates under night and instrument conditions. Chief Pilot for Fairbanks, Morse is Jack C. Jones, an able airman well-known to the member pilots of the Corporation Aircraft Owners Association.

Mallard Air Service Offers Base to CAOA

Recently installed in a new million-dollar hangar at Teterboro Air Terminal, Mallard Air Service, through its president Bob Hewitt, has offered CAOA office space as well as facilities for operators of executive aircraft.

Being completed at the present time is an executive-aircraft operations room, pilots' lounge, weather office and special offices for those corporate aircraft already based at Mallard. Feature of the renovation is the installation of a television set in the pilots' lounge, and the setting up of pilot and passenger "clean-up" facilities which include seven stall showers, etc. Private office space has been set aside for the use of Corporation Aircraft Owners Association. Acceptance of Mallard's offer will be taken up at the next meeting of CAOA, and word will be passed on to members very shortly. Approval is expected, according to word from CAOA's Executive Board.

Several companies are already using Mallard as New York base of operations. They are Dow Chemical, Burlington Mills, Mathieson Chemical and Lever Bros. General Foods, which recently bought a *Mallard*, will also base at Mallard Air Service.

CAOA pilots are invited to land at Teterboro and look over Mallard's facilities. The field has its own ILS, is getting GCA . . . and there is little, if any, airline traffic to worry about.

Small Planes for Business

Clarification of CAR Section 43.60 is in the offing. A proposed amendment to 43.60 will liberalize restrictions against the use of aircraft for business by private pilots.

Section 43.60 currently states that "a private pilot shall not pilot aircraft for hire. . ." This is followed, however, by a note which ". . . permits sharing the expenses of a flight or piloting aircraft in the furtherance of business when the flight is made solely for the personal transportation of the pilot."

The proposed Amendment states "A private pilot shall not pilot aircraft for compensation or hire, or in connection with any business or employment, unless the flight is merely incidental thereto and does not involve the carriage of persons or property for compensation or hire."

This is how the proposed amendment would apply to a private pilot:

1. A private pilot may share the actual operating expenses incurred during a flight, and one or more passengers may contribute to those expenses.

2. As a salesman a private pilot may fly aircraft in the course of his employment, since the flight itself would be incidental to the business of selling. Samples of merchandise also could be carried.

3. A private pilot may pilot a company plane on business to reach another of the firm's offices and may take friends or other employees, provided there is no charge.

4. A private pilot may crop dust or seed his own land by plane, but he cannot do so for another land-owner if it is for compensation or hire.

5. A private pilot may ferry aircraft provided the flight is not for compensation or hire.

6. A private pilot, however, cannot demonstrate a plane in flight to customers, as an employee of, or otherwise for the account of, a person or company in the business of selling aircraft. In this case the flight demonstration is not incidental to the employment or business of the pilot, but is an integral part of the business of selling.

7. A real estate operator who has a private flying license can fly prospective purchasers to land offered for sale.

The amendment is being submitted to the CAB by the Bureau of Safety Regulations and approval is expected.

CAOA OPERATIONS have been offered space and facilities at Mallard Air Service, Teterboro Air Terminal, N. J., just across Hudson River from New York. Field has its own ILS

Fly the Trojan

(*Continued from page* 21)

of climb, I found the ship always went upstairs at better than 500 fpm.

At 3,000 feet, the *Trojan* indicates between 105 mph and 110 mph. At 11,000 feet, the altitude I maintained flying the mountain ranges, the ship indicated between 90 and 95 . . . and still wanted to climb.

Gas consumption is always an important factor when it comes to owning and operating an airplane. Certainly the *Trojan* does well in that category. The least I burned on any leg of the flight was 3.5 gallons per hour, thanks to a mighty sweet tail wind. The most I used was 6.8 gallons per hour, and that was in the face of a 55-mph headwind I flew going into Chicago on the way back home. Average gas consumption for the whole trip was 5.3 gallons going East, and 6 gallons heading West.

Despite the load I was carrying . . . and it was pretty big for such a tiny ship (clothing for three weeks, plus Lear VHF and ADF, and full tanks of gas), I found I could count on a range of at least 500 miles at 2400 rpm normal cruising. Without the extra weight in radio and without a lot of luggage, the range of the *Trojan* should be an easy 600 miles or so. Radio, however, is an important hunk of equipment, and I personally am in favor of less range and more radio. The Lear equipment made navigating easy, and I hit everyone of my ETA's practically on the nose. All of which probably makes me one of the few girls to ever reach a place on time.

Despite the seemingly diminutive proportions of the cabin, the *Trojan* is a comfortable ship to sit in for stretches of two-and-a-half to thee hours at a time. That means you can cover somewhere in the vicinity of 300 miles each hop, depending on whether you have headwind or tailwind. The *Trojan* is fitted with an air-cushion seat that doesn't hit you in all the wrong places and make your legs go to sleep. Nor do you climb out of the ship at the end of a three-hour hop feeling as though you'd lost your hind quarters somewhere.

The finger-tip control I mentioned earlier also goes a long ways toward making an air trip in the *Trojan* fun and frolic. The ship is so easy to keep on the beam that you don't climb out feeling all beat up from a tussle with the stick. In short, the *Trojan* hangs to her heading nicely. Too, the ship trims easily, thanks to the move-forward-or-backward trim handle located between the pilot and co-pilot's seat.

Unlike a lot of 90-hp airplanes, the *Trojan* is a quiet ship. Well muffled, the engine and prop won't give you a case of jitters on long cross-countries. The McCauley metal prop is standard on the ship.

One of the stops I made on the trip East was at the University of Illinois airport at Urbana. No sooner had I climbed out of the cabin than I was surrounded by a group of aviation students and professors. Being on the hungry side, I stayed around only a few minutes to answer their questions, then told them they could pour over the plane as much as they liked, just so long as it would be ready for me to fly away the next morning.

When I got back to the airport the next day, the comments that greeted me proved the group had really made a close study of the ship. Shop Foreman F. B. Schaber, an A & E, lost no time in telling me that in his estimation the *Trojan* was one of the best built lightplanes he'd ever seen. When an A & E offers that kind of comment and doesn't read off a list of things he'd have built differently, you can be sure you've really got a neat bit of sky-buggy.

DOUGLAS Chamber of Commerce president Everett Jones scans the *Trojan's* instrument panel. Chamber's interest was largely responsible for success of the venture

The things that interested and impressed the group the most were the fact that the *Trojan's* wings, wing tips and ailerons are interchangeable; that the top and bottom halves of the fuselage are identical; that anyone in the field can install a complete upper or lower nose without jigs; and that all parts of the plane come formed and drilled for field replacement. All of which is the direct result of Mr. Emigh's desire for factory and field economy in construction and maintenance.

The faith of many people in the Emigh *Trojan* is being repaid. Several months ago, Mr. Emigh and his airplane were deep in the downdrafts that have been dogging private aviation. The city of Douglas, Arizona, came to the rescue by more or less adopting the Emigh Aircraft Company as a civic project. Offered a year's free hangar space at the Bisbee-Douglas International Airport, Emigh set up his assembly headquarters there. Men from Douglas were trained for the job of putting the *Trojan* together, and with them production of the ship was again started.

Planes are now being built at a rate of one a week, and are being delivered to buyers in all sections of the U. S. Price of the *Trojan* has been set at $3,295.00.

Already on the line and destined for full production is a new four-place *Trojan*. This one will be powered by a 145-hp Continental. Harold Emigh is confident of the success of his venture; the city of Douglas is back of him; Emigh has a good airplane; and, as airport manager Grant MacCurdy puts it, ". . . how can he miss!"

Fly the *Trojan* . . . and you'll be sure, too, that Emigh can't miss.

Let-Down By George

(*Continued from page* 27)

it consists of two radio beams. One is transmitted along the runway heading and is called the localizer beam. The other is transmitted in an upward slope from the end of the runway and is called the glide path. The position of the aircraft relative to these two beams is indicated to the pilot by a cross-pointer meter. The vertical pointer indicates the direction of the localizer beam. The horizontal pointer indicates the direction of the glide path. When both needles remain centered, the aircraft is proceeding down the intersection of the two beams and will be in position to make a normal landing upon breaking out of the clouds.

Bendix believes that if an instrument can tell a pilot what to do, it can do the job for him and make fewer mistakes. The Flight Path Computer is the electronic brain which makes this possible. A box 20 inches long with a cross section of 5 by 8 inches, it receives the signals from the ILS and translates them into a corrective control applied by the auto-pilot. In short, it takes over the human pilot's job of watching the ILS indicator, and controls the airplane accordingly.

Along with two others, I went up for a flight with Roy Ryder, Bendix test pilot at Teterboro, to see just how this was accomplished. Except for the take-off and for the actual flare-out and landing, the entire flight was made without using the conventional controls.

At 1500 feet, Roy engaged the auto-pilot. According to his directions, I flew the aircraft outbound along the localizer beam by use of the auto-pilot controller. We made a procedure turn and headed back toward the beam at a 45° angle. At this point Roy reached forward and turned a switch to a position marked '*Localizer.*' As we crossed the localizer beam, the plane automatically turned to the runway heading. After two or three gradually narrowing, corrective turns the aircraft settled down on the beam. We were headed straight for the runway.

As we approached the glide path, Roy urned the switch to a position marked Localizer And Glide Path.' We had nothing more to do. The throttles retarded automatically and the aircraft made its way down he approach, holding airspeed within three miles of the speed at which the control had been engaged. At 50 feet and with hands-off ontrol, we were lined up with the center of he runway and in position for manual flareut and landing.

Randolph Mulherin, CAA Chief of Flight nspection, has been making flights like hese, under simulated and actual conditions, or almost two years. He has piloted the N-9, CAA's flying laboratory, through more than 00 test flights of this nature without a single nissed approach. Mr. Mulherin reports, . . . a warning to stop kidding ourselves nd the aviation world that human beings an fly aircraft with the same degree of acuracy that electronic aids can."

Using Flight Path Control, Mulherin has nade approaches as low as 100 feet and a uarter mile, under actual instrument condiions. Under simulated conditions, he has ontinued some of his approaches to a full-top landing without any reference outside of he pilot's compartment. Manually flown approaches are seldom authorized below 300 eet and three-quarters of a mile. When it is ecalled that bad weather has cost the scheduled airlines an estimated $40,000,000 in one ear, the advantages of Flight Path Control re obvious.

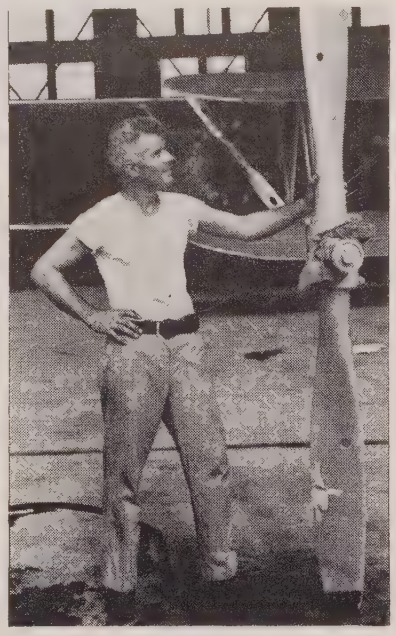
Like any automatic device, Flight Path Control has its limitations. It is by no means substitute for the human pilot, nor is it ntended to be one. Its main purpose is to ighten the load on the human pilot during a most critical period—the instrument approach. Flight Path Control leaves the pilot more time to watch his engine instrument eadings, to double-check the safety of his pproach by listening to GCA instructions, o do the thousand and one little jobs that nust be done during a landing. The results re safer flights and, at the same time, fewer veather cancellations.

At least a dozen major airlines are bearng this in mind. Already equipped with the Bendix auto-pilot, they are looking forward o the day when Flight Path Control becomes commercial actuality. The first installaions were made in 20 aircraft of Trans-Canada Airlines and are now in use.

In addition to its main job of making instrument approaches, Flight Path Control an also be used to automatically track radio eams in airways flying. During a four-hour ight from Washington to Chicago early this ear, the equipment held the altitude of the N-9 to a maximum variation of 28 feet. This s nothing that a human pilot can't equal ut it will leave him pretty tired when he rrives over Chicago perhaps to find marinal weather conditions and a two-hour olding procedure to go through.

Discounting the automatic pilot, with which most airliners are already equipped, he additional weight of Flight Path Control s less than 50 pounds. Cost of the equipment s not great. It is estimated that the loss of evenue on two *Constellation* flights grounded y weather would more than pay for the Flight Path Control equipment that may have nade the flights possible. Consequently here is every reason to believe that some orm of Flight Path Control will soon be in se on all of the major airlines.

A Prop with an "Extra"



CHIEF PILOT Biglow holds prop showing hole shot in blade by 50-caliber gun

You might wonder what would happen if the synchronizing mechanism of an aircraft machine gun went out of kilter and blasted a hole in a prop instead of shooting between the blades. Eugene Biglow, chief pilot for Moody Dusting Service, can answer that one. His company recently purchased a war-surplus BT-13, and found two prominent holes in the prop blades. Investigation turned up the story: it seems that at one time or another, a machine gun was mounted on a BT-13 for experimental purposes.

The ship's logbook disclosed that when the gun mechanism went wrong, it shot a hole in the prop blade. Air Force mechanics fixed the prop up by enlarging the hole in rounding it out and leaving smooth curved edges. The mechs then rebalanced the prop by deliberately boring a matching hole in the opposite blade and rounding it smoothly. This prop was used for several hundred hours and finally retired for one good reason . . . the two-hole prop developed a whistle that was drivin' pilots crazy.

Pilot's Report, Cessna 195

(Continued from page 17)

You'll see how well the Cessna took it, when you find the 195 already recommended for acceptance as one of the three conventional types.

These Cessnas have been in action every day since their arrival last spring, working first on skis in snow up to 8 feet deep and later on floats or wheels from lakes, rivers, sloughs, mud flats, narrow dirt roads, rough fields, mountain valleys and rocky ridges.

They carry cargo, passengers, para-medics, ambulance cases, emergency drop kits, VIP'S, and everything else that might come along. One was on loan last summer to an air force geologist at St. Lawrence Island, others are scattered with 10th Rescue groups throughout the territory.

On emergency evacuation from Stevens Village, 135 miles from Ladd Field at Fairbanks, 10th proved the six-passenger yarn was substantial enough, as their 195's worked out of there with six big men plus full gas loads on flight after flight.

Despite some initial pilot-technique problems and vast unfamiliarity with the aircraft type, 10th is now confidently expecting to get even greater marginal usage from the planes than the factory does. They keep the most elaborate and detailed files possible on every phase of operation and know within a penny of what every flight costs, including crew wages, wear and tear on the planes, and the 195's cost per hour share of keeping the squadron mess, paying the clerks and typists and all other expenses of 10th Rescue Squadron's operations.

With crew wages alone running up to $1200 a month. Major Douglas believes that the Cessna's currently estimated cost per hours of $30 to $35, (which figures complete depreciation of the airplane and all parts and replacements in 5 years at an average utilization of 600 hours annually) is eminently satisfactory. What's more, they can reasonably expect to cut this back to $20 per hour as they increase the use to 1200 hours a year.

"We think that cost is fine," Douglas says, "especially so since each aircraft almost always has two pilots drawing wages against it, and we also pro-rate all other expenses—even the Colonel's salary.

"And as far as single-engine operation is concerned, we don't worry about it. These small, modern engines have become so trustworthy that the chances of a forced landing in the bush because of mechanical failure is almost nil compared to such other operational hazards as excessive bad weather, high winds, and icing that is bad on a light plane at any time."

Obviously, they avoid sending the liaison aircraft into instrument weather and ice, but occasionally it is necessary to work up the bottom of a narrow valley under low ceilings in rain or snow for critical emergency rescue work. The 195 has really won its spurs in proving worthy of this event.

Like all civilians, however, the 195 isn't quite the same fellow it was before putting on the air force insignia.

The remarkable thing is that necessary changes were relatively minor in the over-all picture. We can best show how well the plane performed by detailing the few changes 10th has made for more efficient operation.

For one thing, military pilots are used to fairly heavy brake pressures and the 195 pedals were set at such an extreme and awkward angle that new pilots kept getting vicious braking when all they wanted was a breath of air on the tail. The only serious damage to date has come from this factor in ground loops and 10th whipped it by clamping blocks of hard wood on the heel portions of the pedals to lower the toe angle on the brake elements.

"That eliminated the trouble," Major Douglas says, "by inhibiting the pressure a pilot will exert in shoving both rudder and a little brake in to correct a swerve."

Douglas believes that it is a good brake, but much too sensitive for the original pedal arrangement, which the factory may change along the lines of 10th Rescue's modifications.

Another minor item—they found it necessary to beef up the float fittings on the fuselage and have requested such alterations on factory production of additional models.

Two accessory items concerned the floats and the skis, each plane coming equipped with such items. The water rudders on the floats were poorly located and gave unreliable control in turning, especially in rather fast turns on the floats, therefore, these have been redesigned.

Again not chargeable to Cessna, the skis proved to be virtually worthless and were "U.R.'d" in a hurry. Tenth Squadron requested help from veteran Alaskan bush pilots and they drew up a standard "north country-type" of ski that is built in the Air Depot shops at Elmendorf Field.

"We never did figure out what the stateside skis were designed for," one 10th pilot told me on a flight via the 195 over Cook's Inlet and the Chugach Mountains. "Perhaps for slalom racing at Sun Valley—but not for airplanes in country where snow falls on the ground."

They also had to replace a stock item ski for the tail. It kept flipping upside down and breaking all to hell by dropping into holes and hooking onto timber. It will be replaced next winter with a longer, wider ski that is also steerable.

The Cessna does well on skis, though, and in landings last spring at Valdez, Alaska in 8 feet of powdery snow, the pilots found themselves sinking in 3 feet deep. That necessitated digging inclined runways with their snowshoes, to give the 195 samething to plane up out of—and they did very well. Incidentally, 10th pilots never lack for lots of exercise in the winter as they shovel and trample miles and miles of "runway" in snow up to their ears.

The only structural change demanded for skis was caused by excessive wobble in the spring-gear system. Moving the jack stand forward on the ski helped a bit and a heavy metal stiffener was clamped to the spring to dampen the flexing. Not only did it shake the air frame from stem to stern on take-off, it jerked the wings up and down so violently as to spoil the natural lifting air flow over the wing section, and that increased the duration of and necessary speed of the take-off run to a dangerous level.

At present their conclusion is that a hydraulic shock absorber is preferable for ski operations.

Otherwise, they find the spring gear admirable for the rough treatment 10th's aircraft receive. Especially do they love the fact that when occasion demands drastic action (which is S.O.P. in Alaska, winter or sum-

ner), they can land the ships fully loaded with the brakes set and locked in the air. This might be termed the apogee of short-field landing technique and requires a very close high, ultra three-point attitude at the final stage, usually with flaps and dragging the snow under power for rate of sink control. Here the Cessna's excellent stalling characteristic provides the necessary safety margin at critical speeds.

Dropped in this way, the 195 skids to a stop in 100 feet. I'll guarantee you though, they don't do it for fun, and it's not a widely recommended practice.

At first they did experience rather high oil temperatures on the ground, in the kind of operations underway. A narrow, collar-like lip was attached around the rear circumference of the cowling, disrupting the air flow moderately and setting up the venturi action needed to suck fresh air in past the oil cooler.

Both of necessity and experimentally they have used everything from sub-80 to 100 octane gasoline without noticeable variations in engine operation.

The standard Lear Radio units really deliver. One day a 10th Rescue pilot searching for a missing boat had occasion to radio Naknek, 90 miles away. His trailing antenna was *not* extended and he was only 500 feet above the shoreline. Yet, the transmission and reception was five by five—excellent. For interplane communication on rescue and emergency search flying, 10th has its own clear channel frequency.

The ship the Cessna is most directly "replacing" is the L-5, though its sphere of operations extends somewhat farther than that statement indicates. They have concluded that the 195 is on a par with the L-5 in normal take-off and landing. But the advantages are numerous—a larger payload, greatly increased range, much more speed, and excellent fortune in float operations.

The factory advises that the cantilever wing with its 7-foot root chord gives proportionately greater lift at low speeds with power stepping up center section airflow.

Aileron control remains in a full stall, and they lug along in slow flight at 40 Indicated. In marginal take-off's in the timber country, the 10th Rescue's top bush pilots think nothing at all of picking a wing up to clear a tree at 50 Indicated and they claim the control is positive.

Experiments, and blind canyons, have demonstrated that with full loads at cruising power in level flight, you can apply full throttle and get 1,000 to 1,500 feet in an abrupt pull-up before you drop back to 50 mph, where the airplane will continue to climb steadily at 500 feet per minute.

The planes burn an average of 15 gallons an hour, and S.O.P. is full throttle, high rpm's for take-off and climbing, and 25 inches Hg with 2100 rpms for cruising at 180 mph. With 23 inches and 2,000 rpms it does 160 nicely.

On floats it gets off very well at sea level, but its cruising speed drops down around 130 and the climb is lessened proportionally.

It gets up on the step in quick order, but then it wants to stay there, so they have standardized the technique of jerking it out of the water at 50 Indicated to make the break as quickly as possible. Once free, it accelerates to 90 mph almost instantly through the marginal speed zone.

Aileron action at cruising is pronounced, but limited aileron area reduces available pressures in the take-off range so that they can't use quite the same old technique of "walking" it out of the water with heavy loads. Instead, they simply use the combining technique of ailerons *and* rudder that is S.O.P. for getting out of a narrow, crooked, tree-lined river bed where they operate much of the time.

While limiting instrument operations to extreme emergencies on single-engine liaison types without de-icing equipment, they do have regular occasion to "push" a lot of weather on floats and skis, the theory being that if it shuts down, you'll have stayed in decent range of a river or the endless series of sloughs and lakes that dot Alaska's mainland, and set down to tie up until the stuff moves out. The ships carry emergency rations and all pilots are well trained in woodmanship and the secrets of taking life easy out in the bush.

The essential thing in 10th's use of the standard civilian-model Cessna is that the aircraft has proved itself worthy in the hands of the most demanding group of pilots in the air force.

The 10th is up to bat anytime an airplane is lost, or people are in trouble. Minutes mean lives in the land where Colonel Balchen and Major Douglas run the rescue show, and the men who know say that the "Wichita Wonders" have lived up to the demands made upon them.

℞ For Winter Flying

(*Continued from page 31*)

part of the United States in every type of weather. No matter what type or size plane you fly the techniques are about the same.

First, you have to prepare your plane for cold weather. Wherever the outside temperatures drop below freezing the engine oil should be switched to a lighter grade, usually SAE 30 or 20, depending on how low the thermometer ranges. A 100-hour maintenance check is best to catch the little things that might have been piling up unseen during long summer flying hours, but whether an owner thinks that is necessary or not, the engine compartment of the plane does need a searching inspection and during that required oil change is the best time to pull it.

The ignition system requires a complete going over. Engine voltages sometimes are more erratic during cold weather and systems tend to break down faster once there is a leak. Mag breaker points that are pitted badly should be replaced and spark plugs inspected for tolerance. In case of doubt as to the condition of any plug or ignition lead it should be replaced.

Because of increased static during winter months this is also a good time to have your radio equipment tested by an experienced technician. A good radioman can spot ignition system defects by sounds in the set, making double insurance that the necessary work is done before it causes flying trouble.

The cabin-heater system, from engine to cockpit, should get a complete going-over by any safety-conscious flyer. One of the bugaboos of flying is deadly carbon monoxide gas. Because cabin-heater muffs are usually bolted very securely in places awkward to reach, too many pilots and mechanics tend to skip the required inspection of the exhaust manifold section hidden by the muff. If any cracks develop in that manifold, carbon monoxide from the engine exhaust will seep slowly into the system and be drawn into the cabin. Slight headaches and drowsiness may be a warning that there's something wrong. Any pilot who begins feeling sleepy should, no matter how cold it may be outside, immediately open a window and get fresh air into the cockpit. Use of "pep" tablets to combat flight drowsiness may obscure the real cause until its too late.

At the opposite end of the problem, cabin heater shut-off gates and linkage should be checked for proper and complete operation. Several types of popular light airplanes have cabin vents that can be improved in the field to prevent hot spots in one section of the cockpit and cold in another. Sometimes a smart mechanic can be of great help in figuring out how to re-route the cabin section of a heater manifold, or change a vent to give more comfortable even heating in the coldest weather.

Another way for engine fumes to get back to the cabin is through engine firewalls that "leak." All firewall openings should be closed as completely as possible with rubber grommets around instrument and fuel lines passing through the wall, and unused openings or cracks should be patched.

The engine should receive a thorough cleaning and all oil or other fluid leaks should be traced down and corrected. Cooling baffles and jackets require a check for proper fit and security, since winter is not the time to go gallivanting around with an unevenly cooled engine. If the plane has cowl flaps, they should get a rigid inspection for operation and condition. One of the many reasons for making these checks before the temperature drops too low is that cold-weather maintenance costs are higher than at any other time during the year. In case there's any question about that, watch a mechanic working outdoors or in an unheated hangar—he has to warm his hands on your time.

After the engine inspection or the complete periodic is completed install any winter-flying plates that might be required. Some lightplanes have a special plate used to close off one of the engine air intakes, usually around the crankcase cooling section.

One critical point of cold-weather operation centers in the battery compartment. Don't leave a battery in a plane in freezing temperatures and always make sure that the electrolyte level and charge are up to normal. If the battery compartment is awkward to reach that's tough—just remember the cost of a new battery, because once one freezes it usually becomes worthless since it will probably wind up with a cracked case and plates.

That's the maintenance routine for winter flying. A complete 100-hour periodic should catch all possible defects, but it doesn't hurt to make an extra check.

It should be obvious by now that there are no mysterious preparations as for an Arctic expedition. Naturally, any equipment that has to be cold-weather treated, or rubber lines that are not suited for cold-weather operation, should be taken care of. Just as hot weather, desert, big city smog and mountain flying have their little peculiarities, all based on understanding and competent handling of the airplane, so freezing-weather flight requires extras for the pilot who wants to get maximum use of his plane in all types of contact conditions.

It's tough not to sound like a teacher scolding a classroom of backward pupils, but actually all any pilot can do is say, "I do this," and, "I've found that this way is best." It's up to the listener, or reader, to go along with me and if something I happen to stress sounds unreasonable, the only way I can justify it is on the basis of the experience of countless pilots before me and on my own flying.

The emphasis on proper cabin heating is due to the fact that no pilot can be reasonably comfortable in a small cockpit space while wearing a bulky jacket or a heavy coat. Wear heavy clothes if you will up to the point of getting into a plane, but in flight it's always best to get along with a light jacket or sweater. If the cockpit is not adequately heated, wear a couple of light sweaters, or a sweater under a lightweight jacket. Aside from health advantages (see your doctor or the Air Force on layers of light clothing versus one heavy garment) bulky clothing impedes smooth handling of the controls. As an extra, deep sleeves should be rolled up or fastened securely at the wrist to prevent inadvertent snagging of the wrong control.

Before taxiing out for that first freezing-weather flight, there are several pre-flight items that have to be taken care of. Discard the fancy wheel pants if you have them installed. They're mud, snow and ice traps and make inspection of the wheels and brakes difficult. Lower the normal tire pressure a couple of pounds to give better "footing" on slick surfaces. Don't clean the windshield with a liquid just before a flight; it may freeze and distort or impede vision.

If a plane has been tied down outdoors during a freeze or cold rain, check all surfaces for ice. If any indication exists, it must be removed from both upper and lower surfaces, either by complete scraping or with an alcohol wash. If the wash is used, wait until it is completely dry and re-check for new ice formations.

As an additional precautionary piece of flight equipment, one that I swear by, carry a small bottle-type carbon tetrachloride fire extinguisher with you in the plane, not only for a fire emergency, but to use in washing

North Country Neptune

The Navy's Lockheed *Neptune* holds many claims to fame, not the least of which is the non-stop distance record of 11,236 statute miles flown in just 55 hours, 17 minutes. The Lockheed P2V *Neptune* pictured here is largest combat-type aircraft ever to be equipped with skis. This gear is fully retractable.

off encrusted ice or mud from the wheels and brake assemblies. Using water to clean dirty gear in winter weather is definitely not recommended and carbon tet may not be available at all places you might decide to land.

If you figure that you're all set for your flight and your plane is in perfect mechanical condition, you're ready to start the engine. You may have to use engine pre-heat and oil dilution and some proper cuss words if the weather is really cold, but once you have it started sit tight and run it at idling until your oil is up in the normal operating range. Check everything that has to be checked for normal operation. If your mag drop is close to the no-go margin, don't go. If you have an automatic propeller on your craft make sure that it has full-range operation. Engines equipped with Hartzell or other oil-actuated propellers should be started and stopped with the control in high pitch during freezing weather since the oil may congeal in the actuating cylinder. After starting an oil-actuated automatic propeller in high pitch wait until the oil pressure rises above minimum and the temperature indicator shows a definite rise before moving the control to the low-pitch position.

Okay, the plane is ready for take-off. Snow on the runway doesn't change any of the normal requirements. Initial impetus may be low, but don't try to jump the plane off without sufficient flying speed.

Because engine cooling is more than adequate it is usually necessary and preferable to cruise at 100 to 200 rpm higher than normal to keep engine operating temperatures up. An engine that is too cool can cause as much trouble as one that's too hot. That's the importance of making sure that cowl flaps work right and that all winter plates and baffles are properly installed. Carburetor heat application is no different than in the summer; where ambient temperatures and moisture conditions indicate that it's needed, use it.

Winter landings on wheels can be troublesome where snow and ice are concerned. Avoid crosswind landings on icy runways if possible. Counteracting skids depends on surrounding conditions, but as in an automobile, with the absence of effective traction, don't fight it, but try to ease it by chopping power and going with it if it is too late to make a safe take-off. If the runway is coated with unpacked snow, drag the field to make sure that you can spot the runway margins and then make a tail-low, wheel landing. Packed snow demands the care given to an icy strip landing, an easy-does-it job.

The rest of winter flying comfort is for the man rather than the plane. As far as the pilot's winter comfort on the ground is concerned, I believe he should have a home base or choose a winter base (if he has a choice) where he can park close to operations and maintenance facilities. The service operator should have equipment to aid winter starting and if his maintenance hangar isn't completely heated, at least he should have some means of heating the work portion of it. If the field has a decent snack bar that's all to the good.

That may sound like Utopia but it should be normal at all airports. We're trying to make it "normal" at our base here at Teterboro. Bill Odom knew what he wanted in the way of facilities, and we're doing what Bill would be doing if he were here.

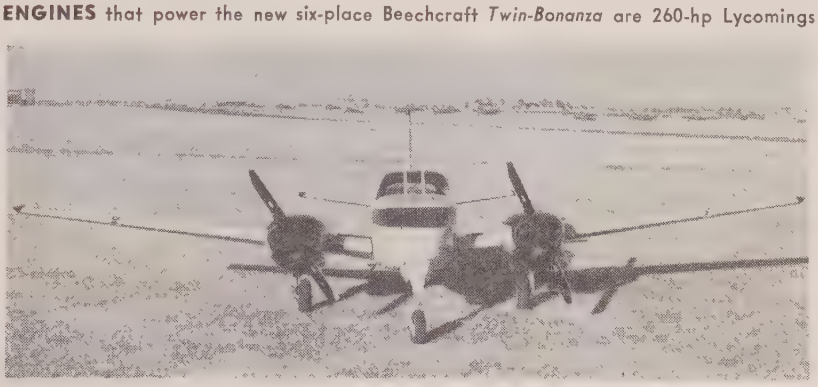
BEECHCRAFT'S newest for 1950 is this twin-engine Model 50, called *Twin-Bonanza*

Announcing: Twin-Bonanza

THE popular Beech *Bonanza* now has a stablemate. Designated the Model 50 and called *Twin-Bonanza*, this new airplane is an all-metal six-place twin-engine ship that is certain to fit the needs of many executive-aircraft operators. This first *Twin-Bonanza* is powered by two 260-hp Lycoming engines which give the ship a cruising speed of over 180 mph and a range of about 1,000 miles. Although designed primarily as a five-place plane, the Model 50 can accommodate six people for shorter ranges. Beech Aircraft Corporation reports the *Twin-Bonanza* will have good single-engine performance under full gross weight conditions, but that details of complete performance and weight will not be made public until testing has been completed and guaranteed figures can be announced.

According to estimates by the manufacturer, the Model 50 *Twin-Bonanza* will be priced at about $30,000, complete. First deliveries to commercial customers have been tentatively scheduled for sometime in the early fall of this year.

ENGINES that power the new six-place Beechcraft *Twin-Bonanza* are 260-hp Lycomings



How's Your S.O.P.?

(*Continued from page 25*)

It is up to the pilot to ascertain the peculiarities of each airplane he flies, and adapt his procedures accordingly. Some airplanes will withstand aerial maneuvers that will place severe structural strains on another. Differences in take-off, air and landing speeds must be considered. Fuel consumption, rate of climb, operational radius, spin characteristics, and engine peculiarities, when unknown, are factors which may cause the unwary pilot sudden grief. Acquiring complete fore-knowledge of a strange airplane's flight characteristics is one procedure that the careful pilot will never overlook.

The beginning pilot will have to start from scratch in developing his S.O.P. He will have to gather knowledge from his instructor, from other pilots, from text books, and from observation, and will have to develop the habit of putting this knowledge into action. Until everything he has learned about airplanes and flying is put to use, his S.O.P. will be of doubtful value.

It will be easier at first to divide S.O.P. into two wide categories—one dealing with flight, the other with ground operations. The novice pilot should mentally subhead under each category various major safety factors and emergency measures as he learns them from others or from his own experience. He should use this mental check list continuously until each act becomes just as much a part of his flight routine as correct handling of the controls.

Standard Operating Procedures pertaining to flight are largely applications of common sense that compel careful judgment, alertness, and the habit of constant and critical observation. Knowing when *not* to fly is one important subhead under this category. Old pilots have a favorite saying that any fool knows when to fly, but only experienced airmen know when to stay on the ground.

There have been a lot of words bandied about concerning the lightplane as a dependable mode of travel. Many pilots, anxious to show up the sarcastic "I told you so's," are apt to let this argument warp their better judgment. They will yearn to take off into a stormy sky or when visibility is poor, just to prove the point. Any glory thus attained does not come from that solid fraternity responsible for the growth of aviation. Cheers for an act like this are like grandstand cheers for the ball-toting halfback who ignores completely the blockers who open his path.

The pilot should be thoroughly aware of his own ability and the ability of the lightplane he is flying to cope with bad weather conditions. This will depend to a large extent upon the instruments the airplane carries and the pilot's skill in using them. There is no substitute for the sensitive altimeter when you can't see the ground; nothing is better than a beam finder when you are groping your way toward an invisible airport. As one old pilot puts it: "Seat-of-the-pants flying and a witch doctor's ministrations are pretty much alike—both were all right before science developed instruments and medicine."

There are numerous stop-and-go signals which the novice pilot must learn to recognize before he can complete his own personal S.O.P. Each of these signals represents a definite act which he must commit or avoid. A few elementary examples will include staying clear of revolving propellers, fastening safety belts, pre-flight adjustment of the altimeter for elevation at the landing point, and checking the incoming traffic pattern before take-off.

A cross-country flight will originate more red-and-green signals than the busiest traffic intersection. An unexpected headwind may endanger the fuel supply necessitating selection of an alternate airport. The pilot must watch for emergency landing spots and maintain sufficient altitude to reach them in a powerless glide. Cloud formations must be studied and appraised for possible turbulence, hail, and icing conditions. Crosswinds require compass correction. Watching the scenery must come second to watching the map . . . There's a lot of room to get lost in the air.

The mere mention of icing conditions will bring a chill memory to many pilots who read this article. A brief study of CAA accident reports will indicate that far too many lightplane accidents originate from this danger. Analysis of these reports will indicate also that many of the accidents could have been avoided *if* the pilot had been aware of conditions that cause ice to form, how to avoid them, and measures to take after icing conditions have been encountered.

The greatest danger from icing, exceeding by far the danger of ice formations on the wings, control surfaces, propeller or fuselage, occurs when the lightplane engine is equipped with a conventional carburetor with the butterfly throttle valve located in the venturi. Ice in the venturi choking the air and fuel passages and blocking the action of the throttle valve, will cause sudden engine failure. To add to the danger, this is most liable to happen during take-off, with the engine at full power, and before enough altitude and airspeed has been gained to permit maneuvering to a powerless landing. Under these conditions, and after ice has started to form, there is no time to use the carburetor air heater.

Unknown to many pilots, humidity, *not* air temperature, is responsible for carburetor icing. When humidity is excessive, when atmospheric moisture exists in the form of a liquid or vapor, carburetor icing may occur when air temperature exceeds 80° F. Danger from icing decreases in direct ratio to a decrease in humidity. There is very little danger from icing when the air temperature is below freezing, as under these conditions excess moisture is effectively "frozen" out of the air.

An elementary physical law controls carburetor icing. When any liquid is vaporized, it draws heat from the surrounding air. This heat is known to science students as heat of vaporization. When gasoline is vaporized by the carburetor jet in the venturi, loss of heat from the surrounding air may cause a temperature drop of from 20 to 60° F. If this drop is enough to lower the temperature of the incoming air below freezing, any moisture in the air will turn to ice. It is this ice that gathers in the venturi and causes the trouble.

When the engine is operating at full throttle, a vacuum in the venturi is at its peak; vaporization of the fuel is rapid, thus increasing the amount of heat withdrawn from the incoming air. Under take-off conditions, with the engine operating at full speed, the set-up for carburetor icing is ideal.

When icing conditions prevail, the pilot should be wary of a decrease in engine rpm and drop in manifold pressure without a change in throttle position. When this occurs, the carburetor air heater should be used immediately. With low-octane gasoline, a full-rich mixture will aid in ice prevention. An emergency measure sometimes effective after ice has formed is to set the carburetor to a full-lean position. This will cause the engine to backfire, and in many cases will blast the ice out of the venturi throat. This is an emergency measure only, and should not be attempted with a supercharged engine, or an engine driving heavy propeller reduction gears.

Avoidance of carburetor icing is much better than any cure. Here again S.O.P. can help. Determine air humidity before taking off. Any weather bureau will have this information. Use carburetor air heat, at least during take-off, when the humidity is high. Avoid flying through cloud formations that may contain moisture in a liquid or vapor form. When such formations are unavoidable, use the carburetor air heater, or a slightly rich mixture, until actual conditions

Vampire Night Fighter

Another version of the famed De Havilland *Vampire* is this night fighter—designated DH-113. It carries a crew of two and a nose full of radar. Pilot and radar operator sit side-by-side, with the radar operator slightly aft of the pilot. Performance of night *Vampire* is same as day *Vampire*, and the plane carries normal four-gun armament.

are ascertained. These are not rules to be read and ignored. They are commitments demanding action from any pilot intent on developing his S.O.P.

Standard Operating Procedures pertaining to pre-flight and ground work are just as important as observing safety measures in the air. Some ground operations are routine in nature, such as pre-flight inspection, refueling, etc., while others are periodic and depend upon the type of airplane, its age, how often it is used, and the amount of work required to maintain it in tip-top flight condition.

The novice pilot should acquire immediately the habit of not trusting the other fellow too far. He must remember that the other guy will be safe on the ground when trouble occurs in the air. The fellow may tell you that he has checked both fuel and oil levels, but there's a chance he may be gambling and covering up his failure to do so. He may tell you that the airplane has been inspected, but that is no insurance against a control cable worn through to a single strand. This is not to imply mistrust of everyone, but rather to stress the importance of double-checking. Whether the other fellow's oversight was intentional, due to forgetfulness, or caused by careless error means little when something goes wrong in the air.

Analogous to the above, the pilot should train himself not to trust the obvious too far. Fuel-level gauges have been known to read "Full" when the tank was empty. Fuel tank filler cap vents may appear open on top but be plugged from below. This happens occasionally when the cap is laid on a dirty or greasy surface during refueling. Connections may appear tight, but it is better to grasp them by hand and test for looseness. This same looseness test should be applied to all control surfaces, the wings, the propeller, and by a general shaking of the airplane to produce newborn rattles or squeaks.

Habit-forming routine in pre-flight inspection is evidence of sound S.O.P.. Inspection should be started at one point and carried out progressively around the airplane. When skipping from point to point, there is a good chance that some vital part will be missed. Include in this progressive inspection tour every part of the airplane where failure would cause a forced landing, or would cause damage to other parts.

Every pilot should acquire the habit of noting peculiarities of operation or control during flight. A hitherto unnoticed vibration may be heard or felt; the controls may bind slightly, or the airplane may be slow to respond; an instrument may act erratically; engine exhaust may be more smoky than usual, or may be spouting an odd-colored flame; the pilot may suddenly find himself "holding against" a newly developed tendency of the airplane to yaw, pitch or roll.

These are warning signals that say as plainly as words that something has happened somewhere. It may not be dangerous, but any change in operational characteristics is due to a change in some functional or structural component of the airplane or engine. Usually, such changes are for the worse. When such a peculiarity develops, it should be investigated immediately. Putting it off may permit what is merely a symptom of trouble to develop into a more serious condition, serious to plane *and* pilot.

Lightplane engines have increased tremendously in dependability during recent years, but this does not mean that the pilot should base his safety on the ability of an engine to keep running. CAA reports indicate that engine failure is still a major cause of accidents. The wise pilot will go "all out" in studying his engine, its operational characteristics, and operational symptoms which indicate that trouble is brewing.

Most engine troubles are symptomatic in character. There is a period of sub-par engine operation during which the trouble becomes progressively worse. Early recognition of these trouble symptoms pays double dividends—the trouble may be remedied before actual failure occurs and before sub-par operation causes excessive wear and tear. CAA regulates the type of work the pilot can do on his own engine, but it is entirely up to the pilot to note when the attention of a licensed mechanic is required.

Engine trouble symptoms are often similar to symptoms that afflict the human body in that the seat of the trouble may appear to be in one place when actually it is somewhere else. A smoky exhaust may be due to oil leakage past the pistons, but more likely it is caused by an incorrectly adjusted or malfunctioning carburetor. Spark plugs do not usually foul of their own accord. An engine can run "hot" despite the efficiency of its cooling system. Low oil pressure is not always due to a defective oil pump. But the mere fact that such a trouble symptom exists is enough warning for the experienced pilot. He will take steps immediately to see that the real root of the trouble is found and removed.

There are various charts available listing engine trouble symptoms and the probable causes of each. One such chart can be found in Civil Aeronautics Bulletin No. 28. This booklet is available from the Superintendent of Documents, Washington, D. C., and costs 75 cents. Such a chart is invaluable to the pilot interested in perfecting his S.O.P.

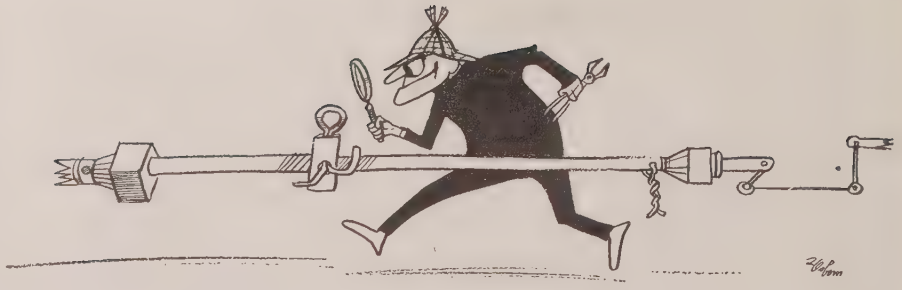
A stern determination to adhere to tried and proven Standard Operating Procedures will assist any pilot in overcoming those bedeviling inspirations that so often lead to trouble. He'll think twice, then resist the temptation to buzz his friend's house. He'll begin to feel contemptuous toward other pilots who try loops and snap-rolls at low altitude, who stay aloft until the airport is but a grayish blotch in the gathering dusk, who try to stretch their fuel supply.

He'll regard with more respect the manufacturer's limitations on both airplane and engine. He'll watch his instruments carefully, noting whether oil temperature and pressure, fuel pressure, and engine crankshaft speed is within the specified range. He'll forego diving at speeds beyond the recommended limit. He'll swallow his pride rather than stretch his glide just to make his approach look good to an airport audience.

When a pilot begins to feel this way, when he has forgotten the rule book but by force of habit goes about flying in a businesslike attitude, when forgetting to perform a necessary act affects him personally like forgetting to breathe or when committing a wrong act affects him like touching a hot stove, then and only then has he acquired the old-timer's version of Standard Operating Procedure.

Dilbert

(Continued from page 34)



and looping a light oil spray was glowing through the cockpit, making it necessary for him to wipe off his goggles every few minutes. After 30 minutes of this, the engine suddenly coughed and quit, necessitating a forced landing in rough terrain.

Investigation showed there had been a break in the oil line and that loss of oil had caused the engine to overheat, then freeze.

Believe it or not, this moron, this Dilbert, admitted he had not read the oil temperature, cylinder head temperature, or the oil pressure gages during the entire flight. Where do you suppose he thought all that oil was coming from? An occasional glance at the instruments would have warned him to return home in time to avoid damage to either his engine or airplane.

It's a sad day when a guy with over 400 hours flying time hasn't even learned to watch his gages, especially in a jam like this. There's a lot more to flying than just manipulating the stick. I don't care how hot you are at the controls, if you don't have enough sense to keep a running check on your instruments, then you don't have what it takes to be a good aviator.

Maintenance Checks—A pleasant day, a sweet-running engine, and 3,000 feet altitude—a perfect setting for relaxation and enjoyment. But all was rudely shattered when the engine suddenly lost power. The pilot push-pulled, click-clicked every control in the cockpit . . . but nothing happened. The subsequent forced landing in a rocky field spread the plane out for inspection.

It didn't take long to discover that the power loss was due to the throttle control rod having become disconnected from the throttle lever. The nut on the clevis bolt which secures this connection had not been cotter-keyed, and the bolt had worked out due to vibration.

Of course, this unnecessary accident was primarily due to inexcusable laxity during assembly, but that doesn't in the least clear the mech who made the maintenance inspections during the 300 hours flight time that had been put on the ship.

During engine, auxiliary and flight-control checks, it is not enough merely to move the controls. Each connection from the cockpit to the actual mechanism must be inspected, especially for tightness of locknuts and rods, and for security of all cotter pins.

Careless Pedestrians—An instructor with a student aboard his plane taxied down the strip at moderate speed, making pre-

scribed S turns. Another preoccupied instructor walked diagonally across the taxi strip, with his back toward the oncoming plane. No, don't guess—I'll tell you. He got away lucky; only lost an arm.

This accident was due mainly to the carelessness of the pedestrian. It just so happened that his path coincided with the plane's blind spot as it S-turned right.

There's one thing about a propeller; it never plays favorites. No matter what a person's rank or title, a moving prop treats 'em all alike—rough.

Propeller accidents will continue to occur until everyone learns to regard them with respect. The following technique may save you from this type accident, but it isn't guaranteed unless you also keep your eyes open and look around.

Cross a taxiway at right angles, so your back is never turned toward a taxiing plane!

Deaf, Dumb and Blind—At 14,000 feet Dilbert noticed his engine surge between 1900 and 2400 rpm. Realizing that all was not right, he decided to go in and land. The engine returned to normal at 8,000 feet, only to surge momentarily again at 5,000.

Dilbert continued on in, joined the traffic circle at 1,000 feet and started to circle the field. Halfway round, the prop acted up again and, when the engine failed completely, he was forced down in very heavy heavy brush.

How this guy ever passed his flight physical beats me; evidently he is deaf, dumb and blind. Certainly he should have *heard* the engine's screams of pain and recognized their portent. He did *see* the throbbing tachometer, but must have had a brain block for he never *said* a word to the tower.

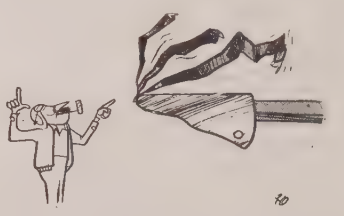
Despite a flock of warnings prior to the

final engine failure, Dilbert was too dumb to let the tower in on his emergency. Had he taken this one small step, everything would have been jake, for he then could have made a straight-in approach instead of circling the field with a bad engine.

Don't pull a Dilbert; pass the word to the tower when you get in trouble and let them help you out.

Famous Last Words—"After taking off, I discovered the cover had not been removed from the pitot tube. When I came in to land to remove the cover, I forgot to lower my wheels."

One training outfit has gone a long ways



toward whipping this pitot-cover hazard. They simply tie red flags to all pitot-tube covers. Brains is king!

SKAUT M-2

Another Czech sportplane-trainer is the two-place Skaut M-2. Powered by a Praga D engine of 75 hp, the M-2 has a top speed of 115 mph and a cruising speed of 102 mph. It has a cruising range of 435 miles.

Atten: Plane Builders

(*Continued from page 33*)

fly over some of the most magnificent sights in all Christendom, but can I see them? No! Every passenger knows that the average airliner has windows which give on to vistas comparable to that seen when gazing through a small mailing tube. Of course, even if these windows were larger, there are still only a few seats in the airplane from which you can see the ground. These seats are aft of the wing, or in the tail lounge in the case of the DC-6. Everywhere else, my view consists of either a shiny, riveted wing surface, or a grease streaked nacelle. Even seeing these is hampered somewhat by the dinky curtains which grace each window, and which lack any and all means to keep them from obscuring less than half of the free glass space. The placement of the window on the fuselage does not help, either. To look out and see the ground, I have to twist my neck to the side and down. Sound unpleasant? It is.

But something, or several somethings, can be done to remedy this. The first thing to do is to build only high-wing transports, and thus eliminate in one fell swoop all the junk which comes between eyes and landscape. The second thing to do is to make mock-ups of the passenger compartment, and have young engineers sit in them for hours, not just minutes. Have them also look out of the windows a large part of the time. Eventually, there will be lots of gripes about muscular discomfort, and the position of the windows will be changed to give the occupant something less than a pain in the neck. (As a matter of fact, has the aircraft industry ever heard of the glass-bottomed boats? Here is a perfectly wonderful idea to swipe.) The third and last thing to do is to leave off those silly curtains. If they must be included for the sake of those who want to doze, or be sick in private, please design a roller-type shade, or at least a decent tie-back for the curtains. Such things have been done for houses with good results.

In passing, let's give plaudits to the de Havilland Company, which made the windows of their feeder-liner, the *Dove*, about twice as large as those now in vogue. It is too bad that there are no *Dove* aircraft operating around here; you don't know what a view of the United States you are missing. The view from the *Dove's* windows is excellent despite the plane's low wing.

Well, so much for visibility and scenery. Now, let's progress to "comfort" in a seated position. All men have a favorite chair at home, a deep, soft, sleepy-looking thing, well sculptured to their own contours. The back is high enough to support a sleepy head, and maybe there are wings to keep the head from falling too far sideways. The arm rests are at the proper height, and the front of the cushion is soft where it gently touches the back of the thighs. But what happens on an airliner? I'll tell you what happens to me.

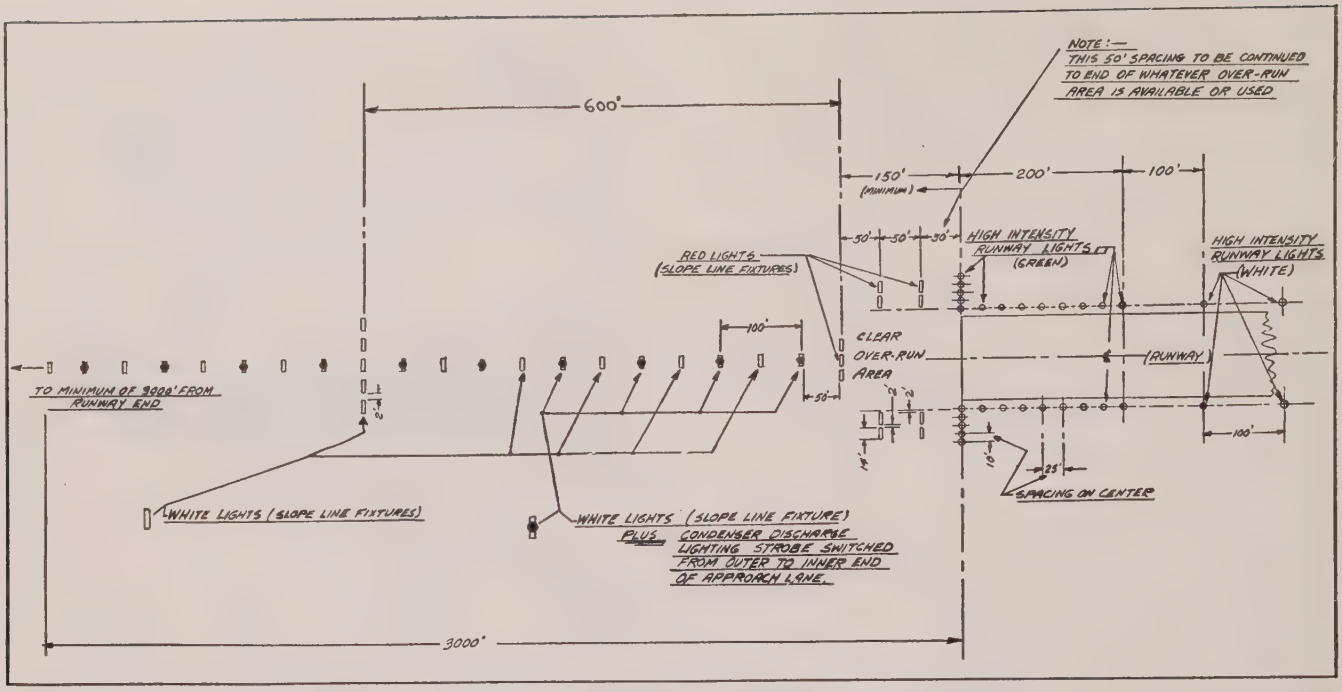
Always, a certain portion of my anatomy, which shall here be nameless, falls asleep long before my mind is ready to accept drowsiness. In a case like this, I generally stand up and walk around a bit to get rid of that followed feeling. Maybe Convair's prickly artificial rump doesn't simulate mine, but I fall asleep from the bottom up.

If I do manage to get to dreamland in the normal manner, I have to keep my hands crossed on my lap, because there is nothing else to do with them. Shortly after I begin to chase blonds, both forearms go to sleep, and that wakes me. They have been pressing into the arm rests, and my thighs have been resting on those knife-edged seat cushions, and my legs are asleep too. There is no way out—I alternately sleep and wake, and while sleeping, my head slips around. That's because there is no place to put my head. I can drop it with a thud to my chest, or bend my neck at an alarming angle to rest on the seat back. When I do the latter, my jaw drops open and I take on a "dead-from-suffocation" appearance. It is hard for the stewardess to reconcile this stuffed aspect with normal, smiling me.

To remedy this, all we have to do is "buy British"—or copy, if it proves to be cheaper. The most solid comfort I have ever seen outside of a bed is a chair built for the British airline trade by Vickers-Armstrong. It has wings to rest your head; arm rests that look padded; soft cushions, and a leg rest that tilts up like a barber's chair when the back tilts down. U. S. airplane seat manufacturers—please copy!

One more thing about seating arrangement—the seats should face aft! The British (must they scoop us on everything?) have

(*Continued on page 58*)



INSTALLATION of slope-line approach-light system is shown in this diagram. First official installation was at New York International

Safe to Fly the Soup

(*Continued from page 15*)

airport lighting aids permits the pilot to orient himself with the ground and change from instrument to visual flight several seconds sooner than would otherwise be possible. With approach speeds of more than 100 mph, it is easy to see the importance of those few seconds.

At Washington, the approach pattern has been revised to provide outer and inner holding "stacks" in the manner of New York. This will speed the landing rate because DCA has formerly operated from a single stack and an airway holding pattern. With ILS, GCA and surveillance radar over a 100-mile radius, Washington, in spite of its notorious "pea soup," is certain to improve its past performance record.

In New York a serious communications bottle-neck has been eliminated through the addition of a fourth channel to the previously existing three radio links between aircraft and the approach control center. Up to now the same channel has been used for giving the pilot final clearance for departure and for the pilot's reporting to the control tower from over outbound check points. Each of these functions now has its own frequencies. The other two channels are for incoming traffic. One provides for talking with planes entering or in the outer stack, and the other for those in the inner stack (three planes only). This ability of outbound planes to clear themselves from terminal control more promptly will undoubtedly speed up the whole traffic handling process.

The new surveillance radar equipment for the New York area is the postwar CPS-5 radar set. It is the latest and greatly improved model of the wartime CPS-1 microwave radar search set (which showed azimuth only), combined with the CPS-4 height-finder. It also includes the Gilfillan moving target indicator (MTI) modification, which eliminates all ground-clutter from the radar returns. It was this combination of GCA and CPS-5, the latter installed for MATS' Operation Vittles Task Force by the Airbourne Instruments Laboratory, which made the phenomenal Berlin Airlift record possible during last winter's soupy weather.

Thus the CPS-5, installed atop a tower at LaGuardia, will, when thoroughly checked and tied in with GCA, give surveillance over approaching aircraft, and permit Airways Traffic Control to adequately sequence ("smooth out") their entry into holding pattern or stacks as the situation demands. Washington, which had an experimental installation of this nature last winter, has actually begun its radar surveillance control operations. In the fall of 1945, just prior to his relinquishing his wartime post of Director of the Radiation Laboratory, MIT, Dr. Lee Dubridge told this writer that such an application would be among the most useful of the wartime radar developments, and that if the country wanted it badly enough it could be in operation at half a dozen key points within three years.

For some years American Airlines has believed that no amount of effort by government or others can so improve service to the public by the airlines as much as that which is directed toward a traffic organization method that will permit a large number of scheduled aircraft to meet their schedules with assurance, regardless of the weather. American has recognized this as the major deterrent to the early expansion of the use of air travel, both by passengers and shippers. It recognizes, however, that most of the engineering and research effort that must be put into solving this problem can be done only by organizations properly representing most or all of the users of the air space. Thus, American's individual effort in this regard has been largely directed toward guiding and aiding a joint effort such as that authorized by the departments of Commerce and Defense and being undertaken by the Air Navigation Development Board (ANDB). This has involved active participation in such underlying technical groups and committees as ATA's Air Navigation Traffic Control Group and the Radio Technical Commission for Aeronautics (RTCA), with its Special Committee 31 (SC-31) which blueprinted the program now being implemented under ANDB.

Such men as American's Dave Little, Bob Ayr, and Captain Sam Saint (now with ATA) are among the top men in the industry in the application of electronics to air navigation and traffic control. To aid in the development of specific equipment, AA has flown thousands of hours in its DC-3 *Alpha*, several DC-4 airfreighters, and its Convairliner *Gamma*—all equipped with experimental radio and radar sets.

American is also whole-heartedly supporting the CAA's current VHF navigation program, which involves the installation of omni-directional range equipment on the ground and companion receivers in the aircraft. In the first scheduled airline move toward utilization of the new "omni-airways," American Airlines has just been granted the very first authorization to use the omni-equipped airway anywhere over the route between Walnut Ridge (Ark.) and Tulsa (Okla.). This will involve only the navigational functions of the new airways, for the CAA operates no traffic control along that particular airway.

American has also filed application for permission to operate using the omni-range facilities on the New York-Syracuse-Rochester-Buffalo-Elmira-New York loop, utilizing both navigational and traffic control features. It is expected that approval from the CAA for this program will be forthcoming before the end of the year, for AA has completed installation of the Collins omni-receivers in all of its DC-6 fleet and in more than half of its 74 Convair *Flagships*. Before winter really sets in, all its aircraft, including the DC-4 airfreighter fleet, will be so equipped.

This New York-Buffalo-New York route, which lies wholly within the State, was selected for the first use of omni-traffic control features because it falls entirely within the jurisdiction of the CAA's First Region. Traffic control centers concerned will be

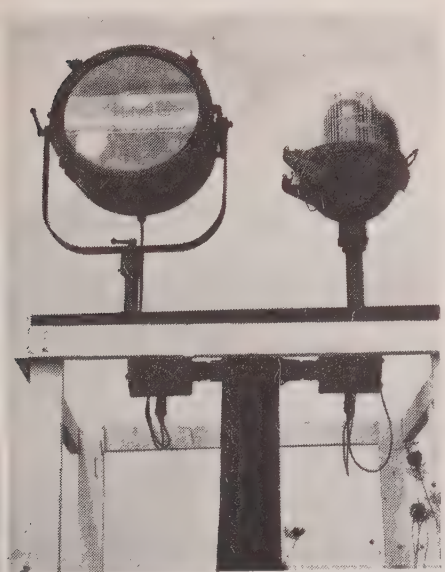
New York, Boston and Cleveland. All pilots have been checked out and operation will start as soon as CAA authorization is received. All AA flights bound for stations named will use the route, and in addition, those *Flagships* headed between New York and Chicago and points west will also use the omni facilities as far as Elmira or Buffalo before shifting back to the presently existing four-course LF radio-range pattern.

The omni-range not only transmits courses in all directions simultaneously instead of only four courses, but because it operates in the very high frequency (VHF) part of the radio spectrum it is static-free. The pilot no longer must listen to monotonous and uncertain "dit-dah" Morse-code signals; with omni he merely watches a vertical needle which tells him when he is on course, and how to fly if he gets off course.

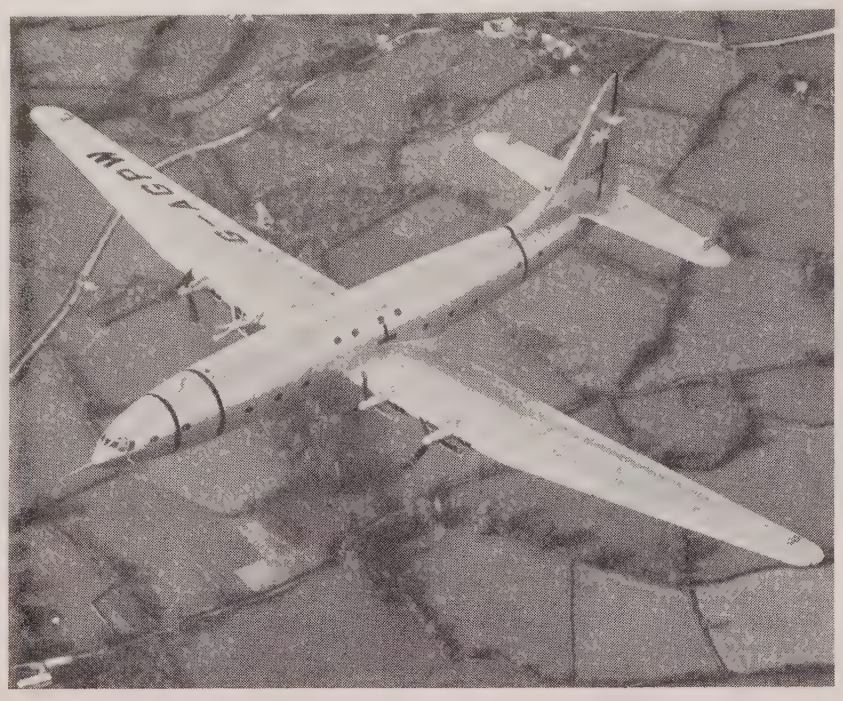
The next time you ride a scheduled airliner in soupy weather and you glance out to see your plane's wing-tip (and that may be as far as you *can* see), remember that the electronic airway is taking you along in perfect safety. All along your journey the pilot is kept on his course by flying the "beam" (4-course LF radio), soon to be superseded throughout the country by the even better VHF omni-range.

When nearing your destination, electronic beacon markers bring your plane into proper position for the approach, and the pilot brings it down an electronic glide path leading right to his correct position for landing on the runway. The friendly voice of the control tower operator (who by radar "sees" your plane at night or in the worst weather) monitors his approach until he breaks through the overcast and makes his touchdown visually, by day or night. If bad weather has caused a few planes to be in the final traffic pattern at the same time, each one is spotted by voice and electronics, and controlled until safely brought in to land.

Despite this improved ability to fly the soup, however, American (as do all airlines) maintains an elaborate weather service which provides weather reports from 15 minutes to a few hours ahead on all its routes. To get there *safely* is the all-important consideration and the record proves the success of the airlines' mission.



APPROACH LIGHTS shown here are Westinghouse-CAA (*left*) and the Army Bartow



BRISTOL BRABAZON 1, world's largest civil landplane, is shown here in its first flight photo. Ship has wing span of 230 feet; will fly London to N. Y. non-stop

SAILPLANE PLUS POWER

(*Continued from page* 29)

is ample leg room, more so in fact than in some two-place powerplanes I've flown.

The engine that supplies the auxiliary power for the *Hummingbird* also was designed and built by Ted Nelson. Constructed of such lightweight metals as magnesium and aluminum, the little four-cylinder pusher engine weighs only 42 pounds. It has a power rating of 34 hp, and turns up 4300 rpm on take-off. The cylinders are high-tensile aluminum die-casting, porous chrome-plated. The crankcase is made of nickel alloy steel and the fittings are aluminum. At the time I flew the *Hummingbird,* the engine had had 200 hours on it and not a single bit of service had yet been required.

When Ted Nelson asked if I wanted to fly the *Hummingbird,* I lost no time in taking him up on the proposition literally.

I climbed in on the left side of the plane and Ted sat on the right. We adjusted chutes and safety belts, then I began a very close and careful cockpit check.

The instrument panel is simple and well defined, containing an accelerometer, airspeed indicator, vertical-speed indicator, altimeter and tachometer. Just behind the instrument panel is a vertical post or column (part of fuselage construction) on which are mounted the engine throttle, the crank handle controls for the retractable landing gear and the engine extension and retraction mechanism.

Between the two seats rest the plastic-handled controls for the ship's metal spoilers and brakes, and the trim-tab control.

On a metal strip set into the plywood behind the two seats and about eye-level are mounted the fuel switch and the engine and battery toggle switches.

The control cable that you pull to start the little 34-hp pusher engine is located just forward of the instrument panel, down close to the floor of the cabin.

The *Hummingbird's* wooden prop is 42 inches in diameter and is pitched to 21. A three and a half-gallon gas tank under the spar provides 45 minutes of powered flight.

With everything checked, we were ready to go for lesson one in powered sailplaning. I switched on the fuel and engine toggles, pulled the engine starter (outboard-style), and as she caught, gave her a bit of throttle. The engine purred for a few minutes and when it seemed thoroughly warmed up and ready, I taxied out for a take-off.

The controls responded to just a mild amount of pressure, and the easy action of the gear and the excellent all-around visibility made the *Hummingbird* a pleasure in ground handling.

We lined up into the wind, eased on some more throttle . . . and were up and away within a few seconds. The ship's mere 34 horsepower certainly did a neat job of supplying all the power needed. The *'Bird* climbed with ease in the almost dead calm of the valley air. I cranked up the landing gear when we were about 200 feet off the ground, and climbed to 2,000 before leveling off. In straight and level, the *Hummingbird* cruised along at a nice 65 mph.

In steep banks, the *Hummingbird* responds smoothly if a little lazily. Quite a bit of rudder is needed, but that's something you quickly get accustomed to. Next I tried a power stall to see if the *'Bird* was as docile as she's claimed to be. I pulled up the nose . . . and waited. The *Hummingbird* mushed a bit, then gave with plenty of warning and sold out at just 36 mph.

By this time we were some distance away from the airport and over pretty rugged terrain. Ted looked around beneath us, then calmly suggested I cut the engine. If you think it's easy for a powerplane pilot to reach over and cut an engine over mountainous terrain, you hop a ride in a *Hummingbird* sometime and try it! At any rate, I finally gathered up the courage necessary to reach over and switched the toggle to the "off" position. As the noise of the engine died away, I automatically picked out a forced landing spot . . . but it wasn't necessary.

As soon as I'd cranked the engine back into its well, the 195 square feet of wing area took over. I caught a vagrant thermal over a ridge, lost it, found it again, and managed to keep with it till we reached some 4500 feet. A pretty good indication of the *'Bird's* soaring potential lay in the 10-foot per second reading I managed during much of the flight.

At 42 mph, the *Hummingbird* is a stable, easily maneuverable and sure-handling sailplane. It has good control response and good stick-control feel.

After riding the thermals and enjoying the quiet that only comes with soaring, I nosed the *'Bird* into a glide and eased down to about 1,000 feet. Although still some distance from the field, I cranked the engine out of its well and up into operating position, started her up and cranked down the *'Bird's* landing gear.

We lost only 100 feet in altitude from that maneuver. The engine creates about 18 pounds of drag when it's "elevated" but not running. This amounts to a sink-speed of one and a half feet per second.

With the airport a couple of miles ahead of us, we cruised toward it at about 58 mph, then turned into the field's traffic pattern. I came all the way back on the throttle, put on the spoilers and entered the final approach. We landed on the runway just like a real airplane, and with as nice a touchdown as I've ever experienced.

Power-wise, the little ship will take off in 900 feet at 40 mph at sea level, and will climb at a good 285 feet per minute. Its top cruise speed is 65 mph and it lands, with gear down, at 42 mph.

As a sailplane with both engine and gear retracted, the *Hummingbird* soars at 42 mph and has a maximum dive speed of 125 mph. It has a sink-speed of 3.25 feet per second, and lands at a mere 38 mph.

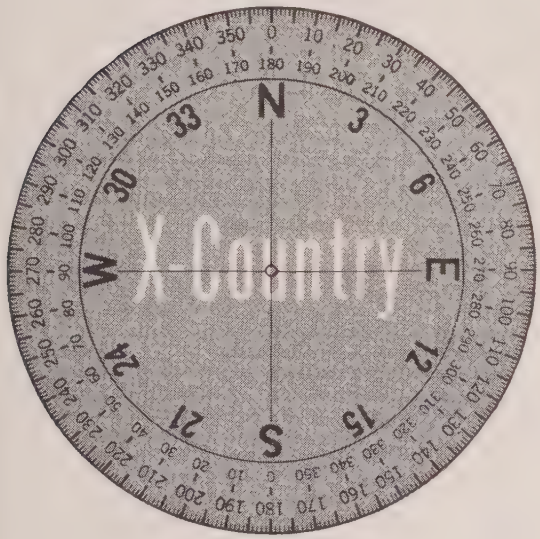
Production models of Ted Nelson's unusual little sailplane will incorporate the customary changes that make for operational improvement. One of the major changes will be in the elevator assembly. Ted plans to add about a 10-pound load to the stick control to provide greater "feel."

Now custom-made, the *Hummingbird* costs between $4,000 and $6,000. With any volume, of course, this cost will come down and when it does, you'll probably see a lot of little motorized sailplanes darting around.

Designer Nelson has aimed his sailplane in the direction of the sportsman who has kept out of soaring because he's felt he'd have to work too hard at it. Now, with the addition of an engine, the soaring enthusiasts can operate out of any airport. He can take off and climb under his own power, convert at will to a sailplane with excellent soaring characteristics, ride the thermals to his heart's content, and return home via his own power again if he wishes.

Having enjoyed and gotten a real kick out of my experience with the *Hummingbird,* I'll wager Nelson's ship will give many, many more airmen hours upon hours of both soaring and power-planing fun.

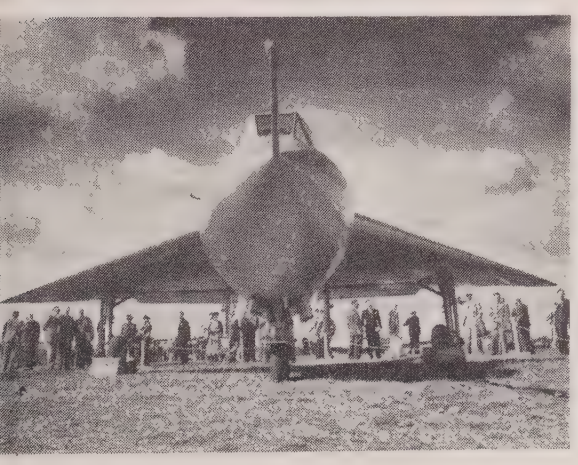
DOUGLAS LIFTMASTER, designated the DC-6A, is cargo-carrying version of DC-6 airliner. The DC-6A will carry 30,000 pounds of cargo more than 2100 miles non-stop in its pressurized, air-conditioned cabin; has speed of 300 mph.



LANIER PARAPLANE is a distinct departure from what pilots accept as the conventional. Peculiar contour of the wing is largely dictated by its vacu-cell control system which permits plane to land almost parachute style under emergency conditions. The plane is powered by 90-hp Continental engine.

RYAN FIREBIRD (*below*) is Air Force's first air-to-air guided missile. It is a rocket-propelled fragmentation shell which homes in on its target by means of radar navigational system. *Firebird* is launched by "mother" fighter plane in direction of enemy aircraft which the fighter plane tracks by radar.

FLYING TRIANGLE, the name given to this Avro 707, fits the plane well, as this low-angle photo proves. The Avro 707 is strictly a research aircraft intended for high-speed and high-altitude work. Avro 707 is powered by jet unit.



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(Continued on page 58)

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(*Continued from page 57*)

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Attn: Plane Builders

(*Continued from page 51*)

been experimenting with this for a couple of years. It is much safer than conventional seating because, in such an arrangement, a passenger can take about 150 G deceleration. This is the equivalent of running into the side of a hill at 200 mph, and stopping in nine feet! Bear in mind, it is not good operating practice to slam into the side of a hill at 200 on the clock, but should it happen, about then would be a very handy time to have aft-facing seats.

Seat spacing is all-important, also. As is the custom with all public buildings or conveyances that seat people, there just isn't enough room between seats—either from left to right, or from front to back. If one weighs around two hundred (and I don't, but have sat next to some who do), then the seat is uncomfortably narrow. With my arms on the rests, my shoulders feel hunched. With my arms in my lap, it feels worse. Then try to find leg room. Go ahead, try it. I find it in the *Convair,* but nowhere else The seats are always arranged too closely in tandem. Also, to top it off, the passenger ahead decides to snooze or relax, and reclines his chair. In the *Convair* 240, this puts his head almost in your lap, which is unhygienic to begin with, to say nothing of the lack of aesthetic appeal of the average head top. A ham-handed individual who once sat ahead of me decided to pillow his head on his outsized hands. Every time he twitched a finger, I got poked in the chest.

In a cold climate, I'd never think of living in a house without some kind of an adequate heating system. But every time I ride in an airplane, surrounded by the frigid temperatures of high altitudes, I do just that. There are many varieties of aircraft heaters, but they all have one thing in common—they either make the plane too hot or too cold. They either cook my window-side leg, or else they permit both feet to become numb and frost-bitten. And always they function best at the end of a flight. The pilot begins his let-down, and suddenly the heaters blast forth copious quantities of hot air; the kind I needed when aloft, trying to keep warm under the junior-sized blanket.

Since I am asking a lot, here's another on comfortization: is it too much to expect the airplane to be cooled while on the ground? A portable cooling unit, modeled after the ones the railroads use at stations to precool their more ancient equipment, could easily be hooked up to blast some arctic breezes into the passenger space. This would be deeply appreciated by those who board airplanes on hot days in the South, and then sit there and cook while waiting for the last passenger to get aboard.

Comfortization is also a function of the smoothness of the ride. In rough weather, most of the airliners flying today will dance from side to side in a form of aerodynamic instability called "Dutch roll." This means that the airplane rolls and yaws at the same time, and it is a hell of a thing to inflict on a nearly-sick passenger. The main reason that an airplane is unstable that way is because the manufacturer's engineers never, never believe that the stability calculations of the Aerodynamics Department could be right. Instead, they have a feeling that everything will be all right with the smaller

tail. Unfortunately, the aerodynamicists often back down, or they are not too confident of their calculations. It is a common error, and one that can be caught in the design stages. Pick it up the next time, please?

Noise, noise, noise: there always seems to be too much. But that is the price one pays for the energy expended in going fast. The most quiet form of travel is walking; horses, which make a few more knots, also make some more noise. Going faster in a car costs you additional decibels in engine noise, too. An airplane is faster, and noisier. So, as long as we have those huge flails up front slicing away at great chunks of air, it is going to be a noisy process, and there is not too much that can be done. But what ever happened to the great NACA investigation of silent propellers, in which noise levels were reduced by half or better? Somebody has forgotten the multi-bladed creations which whispered about their work of tearing huge hunks out of the atmosphere. Memo to designers: look up the NACA reports, and see if some of the decibels can be lost somewhere.

There is one very minor detail that I'd like to have considered also. A house which has steam noises in the heating system, water hammer in the plumbing, an acoustical marvel of a toilet, and a noisy oil burner is not easy on the ears. These are the noises of living with poorly planned or installed systems. In the great airliners of today, things buzz. They resonate at the cruising speed of the engines. At one time or another in flight, these things include ash trays, overhead storage and blanket compartments, fan mounting brackets, the chair mountings, and the table leaves in the back of the DC-6 lounge. The continual loud buzzing as the items vibrate at several hundred cycles per second is annoying, because it can be heard above the engine noise, and oftentimes felt as well.

We will now open hearings on all the reasons why these things can't be done. Engineers are conservative people, and love nothing better than no change. It can be expected that loud howls would be heard from the drafting rooms on the West and East Coast if the customer, the airlines, ever had the gall to make requests like these above for their next airplanes. But it will come, as dawn tomorrow, and when it does, we'll ride in comfort.

Know what they'll say? They'll say that a low-winged absorbs a lot of energy in a crash, or even a hard wheels-up landing, and therefore the low wing is a safer design. But Beech built a transport, the *Twin Quad*, in which the fuselage contains reinforcements to take the chock of normal landings. The *Twin Quad* is a high-winged airplane. Beech pilots deliberately landed the airplane in the sod, wheels up, to see what they could see: no trouble, no strain. Furthermore, a great many of our fighters and bombers belly-landed during the recent fracas, and the pilots and crews walked away. On a large number of these so-called low-wing airplanes, there was a respectable amount of fuselage sticking below the wing. In the landing, the fuselage absorbed energy as well as a wing would. It is the deformation of metal that does it, and it doesn't make much difference where the metal is.

Engineers will also say that aft-facing seats are no good unless the floor to which they are attached is good for the same G loading. This is true, but no reason for not making the floor, and whole airplane, rugged enough to take the shock of a decelerated landing. If you remember the Navy documentary film, "Fighting Lady," you will recall a *Hellcat* which, in landing, hit a 5-inch gun turret. The impact sheared off the "Cat's" right wing tip, and the airplane proceeded on down the deck in a horizontal pinwheeling motion. It lost both wings, the fuselage tail and nose, but—the bulkheads before and aft of the pilot held, and so did the sides, and the whole cockpit stayed together. Grumman built them that way, and lots of Navy pilots were happy that they did. In exactly the same manner, a transport can be made strong enough.

They will say that all these modifications mean weight added, which means either less passengers, or less performance. Facetiously, the answer to the first objection is that airplanes are not always flying with 100 per cent load factors today, and to the second, that the speed of any airplane is judged by the speed of the slowest conveyance that one rides getting to and from the airport. Seriously, weight increases of a reasonable amount do not decrease the cruising speed of any airplane, which is the pay-off performance item. Instead, weight increases mean reduced rate of climb (held to a low value by regulations anyway) and increased take-off distance, which is not too critical nowadays. Stop griping boys, you can do it.

On windows in a fuselage, it is true that cut-outs in a shell structure drive stressmen mad. But there is no law that says there must be one huge window. The multiple, small arrangement could be used, and would not bother the stress and strain people.

About those comfortable chairs: the general comment will be that the seats made in this country are probably better than the British models, and that it is an extremely unpatriotic thing to say differently. Well, I do say differently. That British chair I talked about before is the nuts, and I think that even if the Russians built it, every airline in this country ought to rush right out and replace their present seating with the Vickers-Armstrong model or, at least, get the U. S. companies to build their own like them.

Now, as a sop to those designers who are helping the airlines fling the net of commerce wide over the world, I shall say something nice, so that when and if they read this, they can pause and say, "At last, a kind word!" Here is the kind word: I would rather ride in an airplane than suffer through any other form of transportation. Trains are dirty, buses rattle and stink, automobiles are tiring to drive. By comparison, airline travel, even in what I consider unimaginative designs, is clean and neat. But it shouldn't have to be "by comparison"; airline travel should be so far out in front of the other time-honored ways of getting around that comparisons would not be necessary.

Any air traveler you talk to swears by that method of getting places . . . and sometimes swears at it, but in the main the airlines have done a swell job. Now it's the time for the airliner designers to get on the beam and do good.

By and large, most people travel because they have to. I do, and I will. But please, by 1951 or so, could I see America instead of that damned wing?

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SKYWAYS INDEX-1949

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Too Little . . . Too Late

AN EDITORIAL

WHEN death rides the airways, it's too late to ask "Why?" But Congress is following its customary pattern, that of investigating the cause "after" instead of "before." "After" is too late . . . in this case 55 men and women too late.

The tragic mid-air collision between an errant war-surplus P-38 and a scheduled Eastern Airlines' DC-4 in November brought home with brutal force the oft-expressed opinions of many CAA officials who have maintained for some time that one day just such an accident would happen at a metropolitan airport. The "why" in this instance, therefore, should be, "why weren't steps taken to remove all possibility of such an accident?"

The traffic congestion that exists around metropolitan airports is a known fact. Many an airline pilot knows from experience the "near-misses" that have been scored when other aircraft have cut in front on landing or taken off in the face of a transport coming in. Pilots of private planes and military aircraft are the predominating offenders. The operation of airliners and executive planes at most metropolitan fields has reached the saturation point. At LaGuardia Field in New York, airliners and executive planes come in or go out of the field at the rate of one plane every minute and a half of the operating day. In addition, other non-scheduled and contract aircraft, military and government planes boost the rate to a plane a minute.

The take-off and landing rate at Washington, D.C.'s National Airport is proportionately the same. Thus, it is clearly evident that airports and tower operators are having to handle more aircraft than can be safely handled under all conditions.

To make matters even worse at National Airport, there are two other airports within a hefty stone's throw of the busy commercial field. Across the Potomac from National is the Air Force's Bolling Field, and directly adjacent to Bolling is the Navy's Anacosta. Three fields so close together that traffic patterns either necessarily overlap or come within a slight whisker of each other!! Certainly the operations out of these two military fields, plus operations out of National Airport make the sky above the Nation's Capitol as congested as traffic in a Saturday-night town. And in the air is one instance where there is no safety in numbers.

To prevent catastrophes such as the one that involved Eastern Airlines and its 51 paying passengers, direct and definite action should be taken *now*. Not tomorrow . . . not next week or next month, but NOW! Actually, definite action should have been taken many months ago. If the pilots' earlier warnings hadn't fallen on either deaf or slow-to-hear ears, action would have been taken a long time ago. And in all probability a certain 55 people would be alive today.

The steps to be taken are clear and concise:

1. The operation of metropolitan fields such as LaGuardia and Washington, should be restricted to scheduled airlines and executive-aircraft operation. We include the executive planes in this operation because they comprise a fleet of industry aircraft vital to American business and manned by pilots chosen for their stability and ability. In addition to that, the executive airplane is instrumented for consistently safe all-weather operations.

The operation of any other aircraft for any other purpose should be unequivocally prohibited from a field assigned to the scheduled and executive-airline fleet. Here's one place where the officials in charge of establishing regulations for aircraft and airport operation would do well to grab off a hunk of Defense Secretary Johnson's determination to make something stick.

2. Airports adjacent to commercial air-traffic fields should be closed, and their operations moved elsewhere. Traffic patterns that overlap are breeding places of danger. Close Bolling Field . . . close Anacosta . . . move the activities of those fields to some area where their operations will not only be safer for themselves but will remove the danger element that now exists for commercial and executive air traffic into and out of National Airport.

3. Re-establish the Air Safety Board that so successfully watch-dogged aviation in 1938 and 1939. The study of air safety should be delegated to a single government agency that is completely independent of influences, political and otherwise.

Legislative proposals to re-establish this independent air safety agency are pending in both the House and Senate . . . and they've been there for a long time. Let the Congress dig them out from under the political rubble. The loss of human life is more important than the sad hand of politics.

The Washington accident is another example of too little too late in air safety measures. If nothing is done this time, there'll be tragedy again . . . and aviation will be paying the price of Congressional complacency.

J. Fred Henry

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